The Effects of Health System Reform on Access to Health Services and Medicines for Patients with Chronic Non-communicable Diseases in Hangzhou and Baoji, China

by

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Date: April 2nd 2014
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Thesis submitted in partial fulfillment of
the requirements for the degree of Master of Science in the Duke
Global Health Institute in the Graduate School
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2014

ABSTRACT

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Abstract

Backgrounds

Chronic non-communicable disease has become the leading cause of mortality and morbidity in China, and the growing burdens of NCDs pose a tremendous challenge to economic growth. Since 2000, Chinese government has piloted and implemented a series of policy initiatives to tackle access to health services and medicines. This study compared health seeking behaviors and healthcare expenditures of NCD patients in two cities of China, and tracked the changes across time.

Methods

Structured interview household surveys were conducted in urban areas in Hangzhou and Baoji in 2009, 2012 and 2013. Systematic sampling was adopted and each year around 800 households from each city were selected. Meanwhile, 14 focus group discussions with NCD patients and healthcare providers were used to supplement quantitative data, and to offer potential explanation the changes across time and the differences between the two cities.

Results

The prevalence rate of self-reported NCD was around 30% in Hangzhou and Baoji; Hangzhou was a little higher in Hangzhou than Baoji; and there existed an increase over time in Baoji. There was still an obvious gap between health services

needed and health services actually used. More patients in Baoji chose to use self-medication than Hangzhou, and increasingly more patients in Hangzhou used self-care. The health seeking behavior in the two cities was quite different. In Hangzhou, more than half of NCD patients visited community health centers for outpatient care, while Baoji city had more patients referring to higher-level hospitals. Specifically for prescriptions, approximately 80% of patients chose private drug stores in Baoji, while in Hangzhou, two thirds of patients preferred community health centers. In addition, between 2012 and 2013 in Hangzhou, patients use outpatient services more frequently, and more patients referred to higher-level hospitals for outpatient services, which may be due to the recent implementation of Essential Medicine Scheme.

The total healthcare expenditures did not change a lot, and patients generally paid less in community health centers than higher-level hospitals. The financial burden was heavier for NCD patients in Baoji and Hangzhou: most patients in Hangzhou paid less than 25% of total health expenditures from out-of-pocket payments; while most patients paid more than 85% in Baoji. In terms of out-of-pocket payments, in Hangzhou, most patients spent less than 100 Yuan for one outpaitent vist in community health centers, while the payments reach the highest point between 101 and 200 Yuan.
In the meantime, from focus group discussions, some medical insurance regulations were referred to as being very strict, which brought inconvenience to patients and healthcare providers as well, e.g. restrictions related to prescription volume, prescription

of second-line drugs in community health centers. Also strict enrollment requirements and complex procedures of Chronic Diseases Management Plan became obstacles for NCD patients to actually benefit from this policy initiative.

Dedication

This thesis is dedicated to my grandfather Wenfa Sun, my mother, Lan Sun and my father Gang Jin.

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1. Introduction & Backgrounds

The epidemiological transition from infectious to chronic non-communicable diseases was compressed in China. Along with the socio-economic development, rapid urbanization and globalization of unhealthy behaviors, NCD has become the leading cause of mortality and morbidity in China, and also negatively affects economic growth. In 2005, NCD caused 10.3 million deaths - 80% of all deaths and 70% DALY losses (Tang, Ehiri, & Long, 2013). And currently, more than 200 million people have hypertension and more than 90 million suffer from diabetes in China (The World Bank). Besides, one third of the population aged 18 or above were over weight and 12% were obese until 2010, 303 million adult smokers with 530 million exposed to second-hand smoke in 2008 (China CDC, 2012; Yang, Kong, Zhao, & Wan, 2008). After the economic transformation in 1978, healthcare expenditures increased dramatically; people cannot afford healthcare; essential medicines were not available but expensive drugs and high-tech tests were overused, etc. Since the late 1990s, the Chinese government began to reform health care system to meet peoples' needs for secure, efficient, convenient and affordable health care services.

1.1 Health System Reform in China

The health care delivery system in China is parallel to the administrative system: the rural health system consists of village clinics, township health centers and county hospitals; while the urban areas are mainly served by hospitals, including street clinics,

district hospitals and city hospitals, as well as provincial and central hospitals as the top of the referral system (Karen, Li, & Meng, 2007; Shi, 1997). Before China's economic transformation in late 1970s, services were paid by health insurance payment, and out-of-pocket payments were minimal due to universal insurance coverage (Barber & Yao, 2010). In particular, rural populations were covered under a cooperative medical scheme managed by agricultural communes; in urban areas, a Labor Insurance System (LIS) was established for employees working in either state-owned or collectively-owned enterprises as well as their dependents, and Government Insurance System (GIS) for government staff including the working and retired government staff and also university students (Chow, 2006; Karen, Li, & Meng, 2007; Barber & Yao, 2010).

After the economic reform beginning in 1978, the health system experienced its transformation from government-controlled to profit-driven healthcare. The central government only funded the institutions directly under its control; instead, local governments were responsible for the local health care delivery (Shi, 1997). Along with relatively dwindling government support, public hospitals were allowed with 15%-25% margins for medicines and high regulated-rate for high-tech tests (Karen, Li, & Meng, 2007). In order to attract patients, tertiary hospitals in urban areas enlarged infrastructures, imported medical equipment and medicines. The overutilization of expensive drugs and "high-tech" tests, which is directly linked with the revenues of public hospitals and the income of healthcare providers, has driven up the health care

costs (Barber & Yao, 2010). The total healthcare expenditure in 2011 is $357 billion (5.2% of GDP), more than doubled in five years compared with $156 billion (4.6% of GDP) in 2006; moreover the spending is predicted to reach $1trillion in 2020 (Deu, et al. 2012, World Bank). Based on the China Statistical Yearbook Database for 2011, the average outpatient expenditure per visit in public general hospital increased by 14.9 times compared with 1990, and 13.8 times for inpatient services; however, the per capita GDP increased only 6.2 times during the same period, the annual disposable income per capita for urban residents increased 12.7 times and net income for farmers increased only 8.6 times (China Society of Economic Reform (CSER), 2011). Along with the increase in health care cost, more people chose not to go to the doctor's when feeling ill in the past two weeks, since a large amount of health spending was out of pocket which people cannot afford (Ministry of Health, 2004; Karen, Li, & Meng, 2007). And the situation faced by the poor is worse, considering the increase in healthcare expenditures and inadequacies of medical insurance system (Dummer and Cook 2007, Tang, Sun and Chen, et al.).

In order to solve the unaffordability and impoverishment of medical health services, especially for the rural and the poor, the government has implemented a series of policies (Gail Henderson, 1995). In 2009 the CPC (Communist Party of China) Central Committee and the State Council formally issued "Opinions on Deepening the Health Care System Reform". It has identified that the overall goal of health care reform is "to

establish and improve the basic health care system covering urban and rural residents, and to provide the people with secure, efficient, convenient and affordable health care services“, which consists of five priorities: (1) further improving the basic medical security system; (2) establishing essential medicines system preliminarily; (3) strengthen community health care service system; (4) improve the equity in the basic public health services; (5) facilitating the pilot projects of state-owned hospital reforms (The CPC Central Committee and the State Coucil, 2009). The “Opinions” further details the short-term goal for 2011, which breaks down into four parts: (1) basic medical insurance covering urban and rural populations; (2) improving access to and the quality of basic health care services; (3) reducing the burden of medical expenditures; (4) resolving the problem that access to hospital services is expensive and difficult (The CPC Central Committee and the State Coucil, 2009; Chinese Website, 2012). And the goal for 2020 is to realize universal coverage of basic health services, which targets the system build-up, and in details to set up “a fairly complete public health service system and health care service system, a comparatively sound medical security system, a secured and relatively well regulated pharmaceutical supply system, a comparatively scientific health care institution management and operational system, a multi-sponsored medical configuration so that everyone shall have access to the basic health care services, the multi-layer demands of the people for health care services shall be met preliminarily,

and the health status of the people shall be further enhanced" (The CPC Central Committee and the State Coucil, 2009).

1.2 Universal Health Insurance Coverage

After the economic and administrative reforms, huge changes happened in the way health care is delivered. The agricultural communes were collapsed, and the dissolution of the rural cooperatives resulted in a sharp decline of the insurance coverage (Barber & Yao, 2010). According to the World Bank (1997), coverage decreased from 85% in 1975 to about 10% for rural population (World Bank, 1997; Chow, 2006). The Chinese government piloted and launched a series of health policy initiatives to recover the universal coverage goal. In 1998, the basic medical insurance was introduced for urban employees, including not only those eligible for LIS and GIS but also people working in private sector companies and small public firms (Barber & Yao, 2010). For rural areas, a new cooperative medical scheme was piloted in 2003 and then rolled out across the country (Karen, Li, & Meng, 2007). In 2007, Urban Residents Basic Medical Insurance was piloted to cover the unemployed, including children, students, the elderly and disabled (Barber & Yao, 2010). In 2009, the Chinese government promised to achieve universal insurance coverage through the basic medical security system by 2020, specifically reaching 90% of the population in 2011 (Karen, Li, & Meng, 2007; Chen Z. , 2009).

The basic medical security system has also been established, consisting of Urban Employee Basic Medical Insurance (UEBMI), Urban Resident Basic Medical Insurance (URBMI), New Rural Cooperative Medical Scheme (NRCMS) and Medical Financial Assistance (MFA). UEBMI is a compulsory medical insurance program targeting employees working in either state-owned enterprises or private companies with premium paid by employers and employees together (Li & Yu, 2011). The premium collected is divided into two accounts: one is individual medical saving accounts, basically used for outpatient and emergency services, drug expenses and other self-payments; the other is a municipal-level social risk-pooling account, basically used for inpatient services (Ministry of Health). The individual account, also called personal account, is with no risk-pooling scheme (Li & Yu, 2011). URBMI is a new medical insurance scheme aiming to cover urban residents that are not enrolled in UEBMI; it is financed mainly from individuals, and also local government, who determines the premium based on the financial level (Li & Yu, 2011). NRCMS is a voluntary medical insurance program subsidized by central, local finance and household contribution (Li & Yu, 2011) (Ministry of Health (2009). Considering benefit packages, premiums, and designated health facilities, a great many varieties exist among geographic regions, among different medical insurance schemes. For payment models, bundled payment substituted fee-for-service, and multiple payment models would be adopted together,

such as capitation payment, episode payment and total cost of care payment (State Council of the People's Republic of China, 2011; Ho, 2011).

Between 2003 and 2008, the insurance coverage rates increased dramatically, from 23% to 87%, with 93% and 72% coverage for rural and urban population respectively. In the Health Care System Reform (2009-2011), great attention has been put into the most-likely-uninsured populations in urban areas, including college students, non-state-owned-enterprise employees, non-collective employees, immigrant workers (State Council of the Peopl's Republic of China (12th)). Though 1.26 billion people were already enrolled in basic health insurance scheme, including 237 million covered by UEBMI and 195 by URBMI by the end of 2010, yet a gap still exists, given the number of urban residents being 600-700 million (State Council of the Peopl's Republic of China (12th)) (Freeman & Boynton, 2011). And a few reports indicated that local governments "double enroll" or "involuntarily enroll" residents in order to meet with the target of coverage rate (New Cooperative Medical System Pilot Site Work Evaluation Group, 2006; Ho, 2011). On the other hand, financial contribution for URBMI and NRCMS reached 120 Yuan and 200 Yuan per person, however given the rapid medical inflation, some doubts whether the 200 Yuan makes a difference (Ho, 2011).

1.3 Essential Medicine System

The Chinese government first introduced Essential Medicine in 1979 and the Ministry of Health published the first edition of National Essential Medicine List

(NEML) only including 278 western medicines in 1983. The first revised NEML with 699 western medicines and 1699 traditional medicines was issued in 1996. The list was revised every two years and served to select Basic Medical Insurance Drug Catalogue, however the availability of essential medicines was very poor in both urban and rural areas (Wang & Zhang, 2011). One study conducted in Shandong and Gansu provinces showed about 60% of essential medicines were actually produced in Shandong Province and only 50% for Gansu (Chen, Tang, & Sun, 2011). Pharmaceutical companies lack incentives to produce essential medicines due to the low profit (Tang, Sun and Chen, et al.). Hospitals, where medicines become the most important source of income, (Tang, Sun, & Qu, 2007; Karen, Li, & Meng, 2007) also lack incentives. Physicians tend to prescribe expensive drugs rather than essential medicines, which directly related to their income. The perverse financial incentive increases financial burden to patients, especially those without insurance. Besides financial burden, overuse and misuse of medicines also become a serious problem, e.g. injection and antibiotics. In addition, patients did not have much knowledge of the list (Chen, Wen 2011).

On Aug. 18th, 2009, National Essential Medicine System was official launched to improve the availability, affordability of medicines by cutting the profit link between health institutions, doctors and medicine (Tian, Song, & Zhang, 2012). China 2009 NEML was published along with national formulary and clinical guidelines for essential medicines, containing 255 western medicines and 102 traditional Chinese medicines. The

selection principle emphasizes clinical use and disease prevention along with efficacy, safety and quality. Medicines are proposed to treat diseases with high prevalence, including some chronic non-communicable diseases and some common illness (e.g. cold, fever, abdominal pain and diarrhea) (Tian, Song, & Zhang, 2012). Each province could select its provincial list to supplement NEML. After the implementation, only medicines selected by NEML and provincial list were permitted to be prescribed in community health centers and stations. The scheme is supposed be implemented first in 30% of primary hospitals and then come fully into force by 2012 all over China. Provincial Essential Medicine Lists (PEML), based on different criteria in different provinces, complement NEML with specialized medicines (e.g. gynecology, dermatology) and meet with some special use preference based on local demands and preference. For example, Shanghai gave special attention to the needs of terminal patients; Chongqing cared about local medication taking behavior.

There exist a great many differences between WHO Model List and Chinese EML, including how to categorize medicines - WHO applying the Anatomical Therapeutic Chemical Classification (ATC-C) while China with the classification on Clinical Pharmacology Classification (CPC) (Chen, Wen 2011). Moreover, the selection criterion of WHO emphasizes evidence-based medicine and pharmaceutical economics, presenting potential list transparent for public comments before publication, while China EML was based on experts' recommendations, with final list published after two

rounds of specialist reviews (Wang & Zhang, 2011). The same problem exists with PEML, which result in that some medicines with serious side effects are also included in PEML, like somiton, cimetidine and diethylstilbestrol; and only a few provinces (e.g. Sichuan) apply the method of evidence-based medicine selection and consider the disease status in common patients (Tian, Song, & Zhang, 2012). One of the major differences is for cardiovascular disease medicines when comparing China EML to WHO Model List. For example, Bisoprolol has substituted Atenolol in WHO Model List, however in the newest update version of China EML, Atenolol is still used.

Several problems with the list were analyzed and reported, including no clarified regulation for dosage forms, especially considering various pharmaceutical preparations under the same chemical components; (Tang, Sun, & Qu, Pharmaceutical Policy in China: Issues and Problems, 2007) no special list for children; lack of medicines for non-communicable diseases, and given that some primary health care institutions provide specialty services that require medicines for dermatology, orthopedics, gynecology, the list could not meet the specific service needs of primary health care institutions (Tian, Song, & Zhang, 2012).

1.4 Access to Health Services and Medicines in Developing countries

Peter et al defined access to health services as "the timely use of services according to need" (Peters, Garg, & Bloom, 2008; Campbell & Roland, 2000). It is generally considered that poverty and ill health form a vicious cycle: poverty can create

and increase barriers to access to health services, while ill health can result in and exacerbate poverty (Wagstaff, Poverty and health sector inequalities, 2002; Braveman & Gruskin, 2003). Therefore, it is not surprising that developing countries generally have less access to health services than developed countries. Data for 2002 showed developing countries with 84% of global population, bear 90% of disease burden, but account for only 12% of health spending worldwide (Mathers, Lopez and Murray). On average, high-income countries spend more than 10% of GDP on health care, while middle- and low-income countries only spend 6% and 5.3% respectively; and when comparing per capita health expenditures, there exist huge differences, $3,039 for high-income countries, while $30 for low-income countries (Gottret & Schieber, 2006). What is worse, large amounts of health expenditures in developing countries are paid by out-of-pocket payments. In particular, the number is more than 60% for low-income countries and only 20% for high-income countries (Gottret & Schieber, 2006). On the other hand, social security funds usually occupy only a small share of health expenditures in low-income countries. In particular, the share can be as lower as 2% in Sub-Saharan Africa, 6% on average, but for East Asia and Pacific, social security funds shares a high portion (Gottret & Schieber, 2006).

When considering several indicators of health services availability, there is wide disparity across different countries. For example, according to data from 2007, 57 hospital beds were available for every 10,000 people in high-income countries, compared

with 9 beds per 10,000 in low-income countries, and in terms of doctors per 1000 population, the number is 2.67 but 0.49 in high and low income countries respectively (Gottret & Schieber, 2006). Moreover, within the developing countries, most of the health services are centered in urban cities, impossible to reach out to rural areas, considering poor roads condition, limited public communication services and high travel costs. And taking time from work for a doctor's visit has a higher opportunity cost for the poor too. In the meantime, the out-of-stock of medicines, the absence of doctors, relatively more common in rural health clinics, further discourage patients. Akin and Hutchinson explained the reason patients bypass public facilities and travel further for care is poor quality expected to receive relative to the cost in public facility (Akin & Hutchinson, 1999).

Besides geographic factors, another important factor for less access to health services for the poor is income disparities. Data from 56 low- and middle-income countries showed great differences in the coverage of health services between the lowest and highest economic quintile group; for example, almost 90% of the richest can access to attended delivery, however the coverage for the poorest is less than 40% (Gwatkin, Rutstein, Johnson , Suliman, Wagstaff, & Amouzou , 2007). Meanwhile, Gwatkin demonstrated that the better off rather than the poor were more likely to benefit from subsidized government health services, even though they initially target the poor (Gwatkin, 2004). And in terms of financing for public health services, user fees stands

out as "a contentious source" in developing countries in case that government cannot collect adequate funds (Peters, Garg, & Bloom, 2008). A great many evidence demonstrated that user fees impede access to health care, especially for the poor, though they result in potentially positive impacts on quality (James, Morris, & Preker, 2006). For example, in Zambia, some evidence showed user fees improve the efficiency of provision of essential medicines (Van Der Geest & Kamwanga, User fees and drugs: what did the health reforms in Zambia achieve, 2000).

In most developing countries, health services were delivered by various providers, including those educated with western medicine, traditional medicine practitioners, and quack doctors. Patients have different expectations from different providers (Peters, Garg, & Bloom, 2008). For example, patients can get incomplete dose of drugs from informal providers (Van Der Geest, Self-care and the informal sale of drugs in south Cameroon, 1987). Village doctors are more frequently available, familiar with patients due to long-term relationships (Peters, Garg, & Bloom, 2008).

By and large, in developing countries, the poor, marginal population is more likely to be lacking of access to health services, which needs policy initiative focusing on them in particular. There exist a great many models to describe or analyze access to health care. And one widely accepted framework showed below, consists of four modules: geographic accessibility, availability, financial accessibility and acceptability. Each module includes supply and demand elements (see Figure 1) (Strategies for

enhancing access to medicines program, 2000; Peters, Garg, & Bloom, 2008). Peter et al. use this model to have demonstrated that the poor within developing countries have less access to health services compared to the better off in these countries.

Figure 1:Framework of Access to Health Services (Peters, Garg, & Bloom, 2008)

1.4.1 Access to Medicines

Bigdeli etc. further suggested that the poor in developing countries also have less access to medicines specifically (Bigdeli, Jacobs, Tomson, & etc., 2013). The availability of medicines in either public or private sectors is low in developing countries, around 35%

and 66% separately (Cameron, Ewen, Ross-Degnan, & etc., 2008; Mills, Brugha, Hanson, & McPake, 2002). Generic medicines are better delivered than originator brands in developing countries. (Mills, Brugha, Hanson, & McPake, 2002) Patients, especially the poor are more likely to refer to private sector. (Mills, Brugha, Hanson, & McPake, 2002)

The medicine price in public sector varies widely, some regions with prices lower than or close to international reference prices, e.g. Southeast Asia, while some with prices much higher, e.g. the median price ratios for aspirin is 30.44 in Brazil (Bigdeli, Jacobs, Tomson, & etc., 2013). Considering the lower level procurement cost in public sector, some countries may use the revenues from medicine sales to support other parts of health care system (Bigdeli, Jacobs, Tomson, & etc., 2013). Moreover, 61% of countries still levy tariffs on finished products, 59% for active pharmaceutical ingredients; and 35% of countries still apply importation tax on vaccine imports (Olcay & Laing, 2005). Nine out of ten countries that levy tariffs have less than 10% tariff rate, however considering the mark-ups being added on the tax-included prices, it still increased the cost substantially (Perez-Casas, Herranz, & Ford, 2001). Actually in developing countries, medicine sales contribute to 20%-60% of health spending, more than half of which is from out-of-pocket (World Health Organization, 2004; Cameron, Ewen, Ross-Degnan, & etc., 2008). The retail mark-ups varied across and within countries, and generic medicines usually occupy higher mark-up rate than original brands, which may discourage its production and stocking (Olcay & Laing, 2005).

In terms of non-communicable diseases, a large part of population cannot afford long-term use of medicines; and the cost of one-month combination treatment for coronary heart diseases was equivalent to 18.4-day wages in Malawi, and 5.1 in Bangladesh (Mendis, Fukino, & Cameron, 2007). Besides unaffordable expenditures, half of medicines are prescribed inappropriately, and half of the time, patients use medicines incorrectly (World Health Organization, 2004-2007). Another huge problem is fake drugs, up to 15% of all sold drugs are counterfeit, the number becoming 50% in some Africa and Asia countries (Cockbum & Newton, 2005). For example, in China, counterfeit drugs resulted in 192,000 patients deaths in 2001 (Fackler, 2002). Cockbum, et al further reported that some governments cover up the facts from public view in case that publicity damage the sales of brand-name products (Cockbum & Newton, 2005).

1.5 The Burden of NCD in China

According to WHO statistics, non-communicable diseases (NCD) caused 57 million deaths in 2008, 80% of which occurred in developing countries; and the number may increase by 15% between 2010 and 2020 increase, while 20% for Southeast Asia (World Health Organization, 2011). In China, more than 260 million people suffer from chronic disease, which account for 85% of all deaths, and 3.5 million deaths are caused by cardiovascular diseases in 2011 (English. news. cn, 2012). The Ministry of Health report also confirmed that NCD has become the major cause of morbidity and mortality for rural populations, especially hypertension and diabetes; and the incidence of

hypertension increased much faster in rural areas than urban areas, as has diabetes (Li, Li, & Wang, 2007).

According to the World Health Organization, the direct health care expenditures for NCD in China would reach 5,000 million dollars in 2015 (World Health Organization, 2010). The health statistics yearbook further reported that the healthcare expenditures for hypertension and diabetes increased (Ministry of Health). It is generally recognized that financial burden of diseases is much higher for household with NCD patients than without (Gong, 2009). And studies demonstrated outpatient payments rather than inpatient expenses result in poverty, (Wagstaff & Van Doorslaer, 2003) which is especially true for patients with NCD, considering the long-term medication therapy. Yip and Hsiao (2009) demonstrated NCD has become the major reason for impoverishment in China (Yip & Hsiao, 2009). Though basic medical insurances in China nearly achieve universal coverage, yet the risk pooling is majorly for inpatient services but not outpatient services, which limited its financial protection effect for patients with NCD, because most NCD patients use outpatient services more (Meng, Xu, & etc., 2012). Wagstaff, etc. further reported that NRCMS did not affect out-of-pocket payments a lot (Wagstaff & Van Doorslaer, 2003; Zhang, Cheng, Tolhurst, & Tang, 2009). Therefore, the risk pooling for specific diseases is the strategy to reduce financial burden for NCD patients. Actually 91.8% of municipal level and 80.4% of county level areas have implemented copayment policies for special diseases in

outpatient services, among which 70% of the areas include hypertension and diabetes in the special diseases (Baidu Wenku).

As mentioned above, there still exist barriers in access to health services and medicines in low- and middle-income countries including China, and Chinese government piloted and implemented a series of policy initiatives to reform health care system so as to tackle access and affordability of health care since 1998. In 2006, a Health Care Reform Leading Group was founded involving 16 ministries and "Opinions on Deepening the Health Care System Reform" was formally issued in 2009 by CPC Central Committee and State Council, elaborate long-term and short-term goal. In this paper, I propose to evaluate the effect of health system reform on the access to health services and medicines for patients with chronic non-communicable diseases. This paper consists of five parts, including (1) introduction and background, (2) research setting and methods, (3) results and (4) conclusion and discussion to achieve the following objectives.

(1) Collect, compile and document related health policy.

(2) Study changes over time of health seeking behaviors and outpatient expenditures for NCD patients.

(3) Compare health seeking behaviors and outpatient expenditures for NCD patients between the two cities.

(4) To explore potential explanations behind these changes and differences.

2 Research Setting and Methods

2.1 Research Setting

China has 33 provincial level divisions distributed across more than 5,026 kilometers of landmass. Different regions have various population density, at different levels of economic growth. The coastal provinces are relatively more developed than the interior while Chinese government encouraged a move to inland. Figure 2 shows different strategies targeting different regions (Headey, Kanbur, & Zhang, 2008). The research setting for this study involve two cities – Hangzhou and Baoji, which belong to East Coast and Central China respectively.

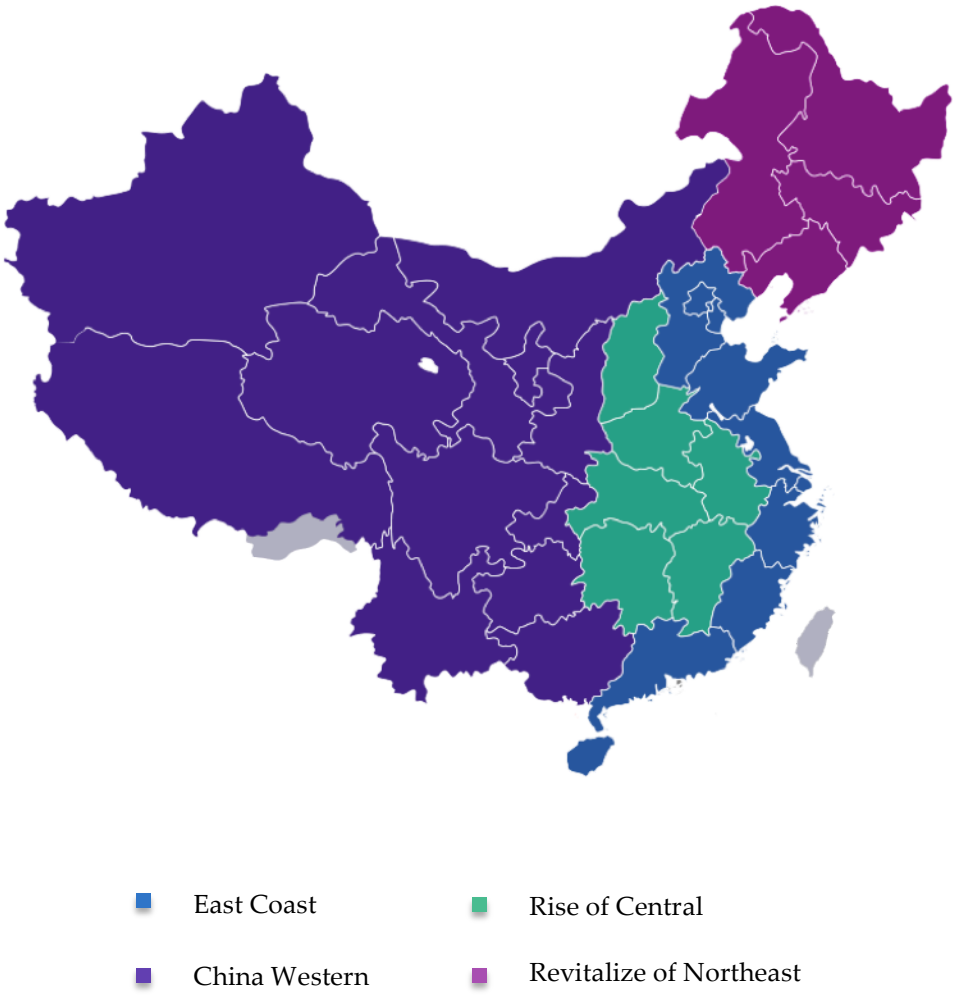

Figure 2: Economic Development Strategies in Four Regions, China (Headey, Kanbur, & Zhang, 2008)

In terms of the administrative structure, under the central government, the constitution of China consists of five levels: the province, the prefecture under the province, the county as well as the township and the village under the township (Figure 3).

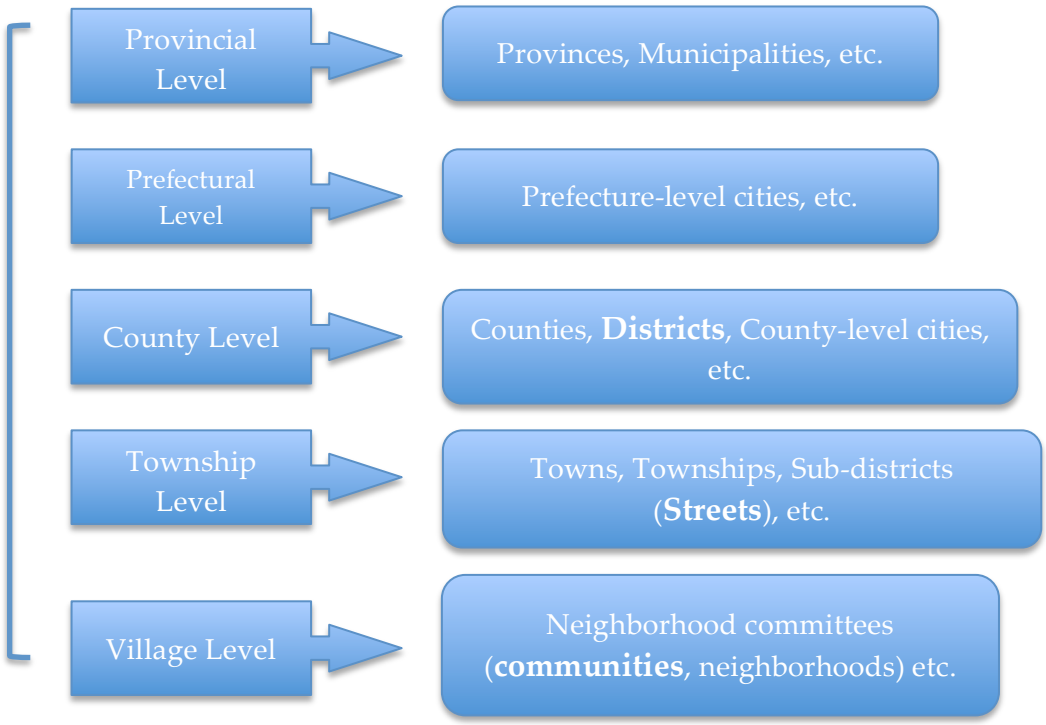

Figure 3: Administrative Structures of Urban Areas, China

2.1.1 Hangzhou

Hangzhou, the capital and largest city of Zhejiang Province, is the center of the Hangzhou Metropolitan Area, and also the sub-center of the Yangtze River Delta Economic Zone. Since 1992, Hangzhou has steady economic growth, with GDP $12.83 trillion for 2012, and GDP per capita $14,572. (resource, 2013) Hangzhou has a resident population of 8.802 million in 16,596 square kilometers, of which 6.540 million people lived in the municipality area (urban and suburban districts) (Hangzhou, 2013). The city proper (urban) has 3.560 million residents (Hangzhou, 2013).

Hangzhou consists of 8 districts, 3 county-level cities and 2 counties. Table 1 shows the socio-economical information of each administrative division. And

Hangzhou, in all, has 127 community health centers, 1115 community health stations (Hangzhou statistic yearbook, 2013).

Table 1: Population, density, GDP and GDP per capital of counties in Hangzhou (2012)

Districts (County)	Area (km^2)	Population	Density (/km^2)	GDP (Million $)	GDP per capita ($)
Metropolitan/Urban Area					
Shangcheng District	18	344,600	18,831	11,001.6	31,925.0
Xiacheng District	31	526,100	16,722	9,832.5	18,689.0
Gongshu District	88	551,900	6,308	6,350.0	11,498.0
Jianggan District	210	998,800	4,751	6,321.8	6,329.4
Binjiang District	72	319,000	4,429	8,025.4	25,158.2
Xihu District	309	820,000	2,656	10,453.9	12,748.6
Suburban Area					
Xiaoshan District	1,420	1,511,300	1,064	26,465.0	17,511.4
Yuhang District	1,224	1,170,300	957	13,719.0	11,715.0
Satellite cities (Country-level cities)					
Fuyang City	1,831	717,700	392	8,890.0	12,386.8
Lin'an City	3,127	566,700	181	6,275.9	11,074.4
Rural Area					
Jiande City	2,321	336,800	145	4,055.8	12,042.2
Tonglu County	1,825	406,400	223	4,092.8	10,070.8
Chun'an County	4,427	453,000	102	2,614.6	5,771.8

2.1.2 Baoji

Baoji, the second largest city of Shaanxi province is the transportation interchange connecting the capital cities of four provinces (Shaanxi, Gansu, Sichuan and Ningxia Hui Autonomous Region). The GDP of Baoji in 2012 is $23.174 billion with the

residence population of 3.74 million and the GDP per capita is $6,209 (Baoji (Shaanxi), 2012). Baoji consists of 3 districts, 9 county-level cities (Table 2).

Table 2: Population, density, GDP and GDP per capital of counties in Baoji (2012)

Districts (County)	Area (km^2)	Population	Density (/km^2)	GDP (Million $)	GDP per capita ($)
Metropolitan/Urban Area					
Weibin District	728	448,189	448,189	5,645.3	12,595.8
Jintai District	332	394,538	394,538	3,359.6	8,515.3
Chencang District	2,517	595,075	595,075	2,215.3	3,722.7
Rural Area					
Fengxiang County	1,179	483,471	483,471	1,984.2	4,104.2
Qishan County	855	459,064	459,064	1,864.9	4,062.3
Fufeng County	751	416,398	416,398	1,139.1	2,735.6
Mei County	863	299,988	299,988	1,023.8	3,412.8
Long County	2,418	248,901	248,901	602.8	2,421.8
Qianyang County	959	123,959	123,959	341.4	2,754.0
Linyou County	1,806	90,728	90,728	316.1	3,484.0
Feng County	3,187	105,492	105,492	1,496.7	14,188.0
Taibai County	2,780	50,928	50,928	186.4	3,659.5

2.2 Research Methods

Mixed methods are used to evaluate the effect of recent health system reform on access to health services and medicines for patients with NCDs, consisting of household survey and focus group discussion. In terms of household survey, data used in this study was collected in 2009, 2012 and 2013 respectively.

2.2.1 Household Survey

2.2.1.1 Sampling

- Hangzhou

For household surveys, systematic sampling has been used. Since the focus of this study was urban districts of the city areas, we randomly selected 3 districts out of the 6 districts in the urban area of Hangzhou, namely Xiacheng District, Xihu District and Binjiang District. For each district, 2 streets were selected; for each street, 3 communities were involved in the study; for each community, approximately 50 households were randomly selected each year. Detailed information is shown below (Table 3).

Table 3: Sampling Distribution by districts, streets and communities of Hangzhou (2013)

Districts (County)	*Streets (Township)*	*Communities (Village)*	*Households*
Xiacheng District	Tianshui Street	Dengxinxiang	47
		Huanbei	53
		Huangqinyuan	47
	Zhaohui Street	Damuqiao	52
		Yugongqiao	60
		Tangnan	53
Xihu District	Cuiyuan Street	Baoting	53
		Jiulian	51
		Cuiyuan No.3 community	51
	Wenxin Street	Fuxin	51
		Jinle	56
		Jingzhou	35
Binjiang District	Xixing Street	Gonglian	48
		Miaohouwang	30
		Xingmin	37
	Changhe Street	Jiangyi	44
		Wentao	15
		Zhongxing	44
Total		827	

- Baoji

Similar systematic sampling is used in Baoji city. Among the 3 districts in the urban area, two districts were selected, namely Wenbin District and Jintai District. For each district, three streets were selected; within each street, three communities were picked up; for each community, around 50 households are selected each year (Table 4).

Table 4: Sampling Distribution by districts, streets and communities of Baoji (2013)

Districts (County)	*Streets (Township)*	*Communities (Village)*	*Households*
Jintai District	Dongfeng R. Street	East Dongfeng Road	37
		South Baoshichang	55
		Baotiehuayuan	47
	West Zhongshan R. Street	Dongmenkou	50
		Nanmenkou	48
		Xinweixiang	46
	Qunzhong R. Street	Baoping Road	55
		Wangjianian	48
		Beishoulin	52
Weibin District	Jing'er Road Street	Jingyi Road	45
		Xinbao Road	56
		Xinmin Road	52
	Qiaonan Street	Huoju Road	47
		Zhongtan Road	53
		7107 Factory	50
		Tieyijuwuchu	44
	Qingjiang Street	Qingjiang Road	35
		Lingyun	56
Total	876		

2.2.1.2 Preparation & Data Collection

The Health Economics Center of the School of Public Health at Fudan University is the major institution responsible for the household survey development, data collection, and data entry.[1] The team consists of professors with expertise in health policy researches, research assistants with experiences in research methods and analysis,

[1] The project is part of the project – Access to Medicine Grant Application Submission, sponsored by the Alliance for Health policy and System Research.

as well as PhD and master students from Fudan University and Shanghai Jiao Tong University with great trainings and solid relevant backgrounds.

- Survey Development

The survey in this study has been used to collect data in 2009, 2011 and 2012 respectively. The original one used in 2009 consists of five parts, including (1) general information of the respondent, (2) outpatient services conditions within 14 days, (3) inpatient services conditions within one year, (4) the health condition of the respondent, (5) household revenue and expenditure of the respondent. The 2012 version has few slight changes (see Appendix A for details). The 2013 version adds one extra part focusing on access to medicine besides the original four, namely (6) rational use of medicine and satisfaction rate; and also extends questions related to NCDs in the second part (see Appendix B for details). Most of this study is based on data from part 1, part 2 and part 6.

- Data Collection

All students, who would conduct the survey interview, are required to complete one-day training, which were conducted by at least two PhD students, two days before taking off. Students are in groups of 6 to 8, with one PhD or master student as the team leader. Each team was assigned to one community each day, responsible to finish around 50 household surveys in that community. The questionnaires for the next day were distributed to each group one night before, along with small gifts for the

respondents. Each team based in the community health center or stations in that community; physicians working in the center helped the team contact residents. Some interviews were conducted in the center when it was convenient for respondents to drop by, and some required students to visit residents' homes to conduct the survey with notification on phone by physicians. Every day right after the interview, students were required to review and check the questionnaires before submitting to the team leader, and reported the progress and asked questions and concerns from the past day. In general, each student in the team interviewed 6-8 residents per pay.

2.2.2 Focus Group Discussion

The focus group discussion (FGD) consisted of two parts in the two cities: one part conducted with patients with NCDs, and the other one with health providers.

2.2.2.1 Sample

- FGD with Patients

The sampling attempts to include patients balanced on gender, with various non-communicable diseases and different stages, and also benefited from different types of health insurance packages and in various financial situations. The participants recruited covered patients experiencing hypertension, heart disease, diabetes, cancers, kidney diseases, etc., but most of them are benefited from UEBMI for retirees.

Patients were selected based on health facility level, and participants were selected and contacted by healthcare providers working in the health facility, majorly

because physicians were more familiar with the health condition and disease history of patients than us. Therefore most participants were those that visited the health facility regularly enough that physicians and patients at least knew each other and got along well usually; or they were visiting on the day when focus group discussion was implemented.

In Hangzhou, until now, all FGDs were conducted in community health centers (or stations). The sampling districts match the districts selected for household survey in order to supplement quantitative data. In each district, one focus group discussion was conducted in one community health center (or station). Each group consisted of 8-10 patients and the discussion lasted about one hour. In Baoji, different sampling strategy was adopted. In particular, different levels of health facilities were selected. In total, one 1st tier, two 2nd tier and another two 3rd tier were selected.

- FGD with Healthcare Providers

As explained before, the health facilities were selected for discussion with patients and also with health providers. The healthcare providers who participated were from different departments including nurses, pharmacists, and administrative officers from different departments.

2.2.2.2 Preparation & Data Collection

- Guideline development

The research question of this study is about access to health services and medicine and the targeted population is patients with NCD. Based on the research question, the major relevant themes were filtered.

For patients, the objective is (1) to acquire general information of participants including disease history, drug uses, etc.; (2) to know how patients evaluate their experiences of access to medicine; (3) to investigate their opinions towards different levels of health facilities; (4) to explore the attitudes of healthcare system reform. Therefore, the guideline includes corresponding four parts.

For health providers, the themes consist of three parts, (1) to get the assessment of different NCD drugs by physicians; (2) to investigate the attitudes towards healthcare system reform; (3) to gather suggestions for further health policy. Therefore, the guideline includes three parts.

- Data Collection

The focus group discussions were conducted in the selected health facilities. The principals of each health facility were contacted beforehand and notified of the following issues: (1) the objective and goal of the research and the focus group discussion; (2) the major themes and interview guidelines; (3) the qualification of participants; (4) the time of the interview. Participants joined in the research voluntarily: some were recruited and confirmed beforehand, and some were selected conveniently.

In terms of some patients, who could not come, one family member would be invited in the discussion instead on behalf of the patient.

Right before the interview, the informed consent was explained to participants, underlining the objective and potential influence of the research, the contents of the one-hour focus group discussions, the rights participants have. During the interview, despite the prepared interview guidelines, questions were semi-structured and flexible with the major concerns of the participants interviewed. For example, since Essential Medicine Scheme was just implemented in Hangzhou recently, the policy received wide attention and it was mentioned a lot by most participants during the discussions. On the other hand, the same policy was enforced several years ago in Baoji so that it was seldom discussed in Baoji. The goal of the interview is to touch deep insight rather than to cover all concerned issues.

2.3 Data Analysis

2.3.1 Quantitative data analysis

Quantitative data are analyzed using Stata software.

2.3.1.1 Data Cleaning and Combining

Data cleaning was conducted for data of each city and each year during the initial analysis, and data conflicting each other logically were fixed up. For example, participants insured with the UEBMI for retirees but were younger than 30 years old;

participants indicated regularly visiting doctors for non-communicable diseases but did not have NCDs.

After cleaning the data, I combined the three-year data for each city and then merged the two cities to get the overall data set. For variables only developed in 2013, only combine the 2013-year data of the two cities. After the combination, some variables were missing in one city for one year, which I need to be aware of during the analysis.

2.3.1.2 Indicators

- Non-communicable Diseases

This variable successfully separates the targeted population – patients with NCD from the general population. Specifically, participants were asked whether having any diagnosed NCDs or not. NCD in this paper includes cardiovascular disease, diabetes mellitus, cancers, chronic respiratory disease, mental health problems, arthritis, and other chronic conditions.

- Demographic Indicators

A list of regular demographic data was collected, including age, gender, occupation, and the city of residents (Baoji and Hangzhou) and the year when data were collected (2009, 2012, 2013). Also, the type of health insurance was gathered. In terms of age, the data were categorized into four groups, namely 0-20, 21-40, 41-60 and 61 and over for further analysis. The medical insurance was categorized in two main groups -

UEBMI, URBMI, even original data has detail information about subcategories and NRCMS as well as private insurance.

- Indicators measuring the use of outpatient services

During the interview, respondents were asked whether they were feeling sick in the previous 14 days, and whether they had received any treatment (including self-medication). Then, one indicator captured information of type of health care, self-medication only, outpatient visit only or both. Another variable – the number of outpatient services received in the previous 14 days, also reflected the information of type of health care. Type of health facility patients referred to for outpatient services was also collected, which include private clinic, community health center and station, district- and city-level hospital, military hospital, traditional hospital, private hospitals and others to exclude the options. Financial variables were also included, including the total outpatient health expenditures and out-of-pocket payments. Several indicators target NCD patients. One asked NCD patients how many times they went to see a doctor regularly. This indicator shows the frequency of outpatient visits for patients with NCDs.

The preferred location for purchasing drugs was a variable, and the location included community health station, community health center, township clinic, village clinic, hospital, private clinic, drug store and also others to exclude other probabilities. Another question requested respondents to report the time cost for the preferred

location. The reason for the preference was also arranged and listed into four categories – convenience, choices, prices and copay rate.

- Indicators measuring attitudes.

In the household survey, responds were asked to evaluate their experiences related to health insurance in five scales. A list of variables aim to measure patients' evaluation of access to health services and medicine, including (1) whether asking for specific drugs, (2) whether asking for injection, (3) whether access to medicines being more efficient, (4) whether health expenditures having increased, (5) whether the price of medicines having increased, (6) whether feeling the quality of drug being better, (6) whether feeling drugs being more efficient, (7) whether having received injection. Each variable was categorized into five scales with being indifferent in the middle.

2.3.2 Qualitative data analysis

NVivo software is adopted to analyze the qualitative data. Since the interview was semi-structured and also flexible with research settings, instead of structured coding, transcripts were coded and the codes were arranged and summarized into themes. For this study, qualitative data was used to supplement and explain the quantitative results from household survey; therefore, themes were selectively presented to support quantitative results.

Diverse coding methods were used during the first coding process, including descriptive coding, initial coding, evaluation coding and versus coding (Saldana, 2009) (Miles & Huberman, 1994).

- Descriptive coding (Topic coding)

"Descriptive coding summarizes in a word or short phrase – most often as a noun – the basic topic of a passage of qualitative data, but not the content" (Saldana, 2009).

Listed below is one example using this method to code my transcripts, and words in bold is my codes.

"The diversity of medicines in community health centers decreased a lot. I have to go to higher-level hospitals to buy those I cannot get here. It is very hot. One time I got hyperthermia and threw up. It was very inconvenient. I am with a high degree of myopia. When raining, I cannot see streets very clearly." – **Negative** & **essential medicine scheme – diversity**

- Initial coding

"The goal of initial coding is to remain open to all possible theoretical directions indicated by your readings of the data" (Kathy, 2006) (Saldana, 2009).

Listed below is one example using this method to code my transcripts, and words in bold is my codes.

"The medicines produced by different companies have different efficiency. There was little medicine in community health centers. The elder visit community health centers more frequently, so drugs targeting the elder should be equipped more here, for example, medicines for hypertension, diabetes and heart diseases. The attitudes of health providers here is very good, but few patients are here. It was not normal." – **Little medicine**, **more drugs needed**, **respect patients in CHC**, **few patients in CHC**

- Evaluation coding

"Value coding is the application of codes onto qualitative data that reflect a participant's values, attitudes, and beliefs" (Saldana, 2009).

Listed below is one example using this method to code my transcripts, and words in bold is my codes.

"Patients prefer 3rd level hospitals, so there are less patients in 2nd level. The average cost per visit for 2nd level is half of that for 3rd level, which may result in patients transferring to 3rd level hospital. I suggest to increase the difference in the copay rates between the two." – **recommendation & medical insurance – copay rate**

- Versus coding

"Versus codes identify in binary terms the individuals, groups, social systems, organizations, phenomenon, process, concepts, etc. in direct conflict with each other" (Saldana, 2009).

Listed below is one example using this method to code my transcripts, and words in bold is my codes.

One patient in Hangzhou said,

"Community health centers should hold more lectures introducing and promoting health information."

One physician in Hangzhou said,

"We do not have time to lecture people; our responsibility is to treat patients." – **health lecture & physician's role**

Though the methods listed above are used simultaneously, descriptive coding and initial coding are the most often used methods. The second cycle coding is to further explore the similarities among the codes generated from the first cycle coding, so as to arrange them in categories.

3 Results

3.1 Medical Insurance System

3.1.1 Hangzhou

In 2004, Hangzhou Municipal Government enforced "Hangzhou Urban Basic Health Insurance Regulation", which "Hangzhou Basic Medical Security Regulation" enacted in 2008. The regulation, targeting urban employers, defined contributions; risk pooling, benefit package, and financial aid for catastrophic diseases.

For contributions, employers and employees together are responsible for the premiums; meanwhile, government provides some supports in some districts. For employers, the amount was calculated by multiplying a baseline number (total salaries of all in-service employees during the last month) with a certain rate. Different rates are applied to private-owned or state-owned enterprises separately. Part of the premium contributed to three social risk-pooling funds: one used to cover inpatient services for general urban employees, one to cover outpatient services for civil servants and the third to cover outpatient services for retirees. Employers are supposed to submit the amount weighted the last-year average income with different rates according to age of employees. For retirees, the premium is paid by social risk-pooling funds and pension for the elder.

The benefit package is detailed for inpatient services and outpatient services separately. For inpatient services, the regulation specified the threshold (deductible), the ceiling (reimbursement cap) of 80,000 Yuan and the copay rate. The threshold varied for different levels of health facilities, and the copay rates were different for retirees or employees. For outpatient services, the thresholds and copay rates are different for employees, civil servants and retirees.

Since Jan. 1st 2008, Hangzhou Municipal Government began to enforce "Hangzhou Basic Medical Security Regulation", which defines medical security systems including Urban Employee Basic Medical Insurance (UEBMI), Urban Residents Basic

Medical Insurance (URBMI), New Rural Cooperative Medical Scheme (NRCMS), and Medical Financial Assistance (MFA).

For Urban Employee Basic Medical Insurance (UEBMI), there were several changes, including:

(1) The contribution rates for employers increased from 9.5% to 11.5%, which contributed not only to medical saving accounts, social pooled funds, but also financial aids for catastrophic diseases;

(2) It was clarified that medical saving accounts may pay for general outpatient services, inpatient services and outpatient services for specific diseases;

(3) For inpatient services, the ceiling increased from 80,000 Yuan to 150,000 Yuan. The thresholds for 2nd and 3rd level health facilities remained 600 Yuan and 800 Yuan; while the threshold dropped 100 Yuan to 300 Yuan for 1st level and community health centers. The copay rates were categorized into more details, reflecting that medical insurance policy favored community health centers with higher copay rates compared to higher-level hospitals. Within one year, patients only needed to pay one threshold instead of up to three thresholds, which was the case before 2008.

(4) For outpatient services, provisions were more detailed and clarified. The threshold stayed the same for the employed but decreased for retirees. Similar to inpatient services, copay rates were distinguished between different levels of health facilities in order to promote patient attendance at community health centers.

In addition, Urban Resident Basic Medical Insurance (URBMI) was introduced. The insured were required to pay the premium, which was subsidized by government. In particular, the child[2] paid 150 Yuan with 250-Yuan subsidy from government; the elder[3] submitted 400 Yuan with 500 Yuan from government; others paid 900. For inpatient services, the ceiling was 100,000 Yuan without copayment above the ceiling; the threshold was the same as UEBMI; the copay rate was again higher in community health centers than higher-level hospitals. For outpatient services, individuals first paid the 300-Yuan threshold and the copayment after that was reimbursed with 40% for 3rd level health facilities, 50% and 60% for 2nd and 1st level.

In December of 2009, the ceiling for impatient services was further raised to 180,000 Yuan for UEBMI and 150,000 Yuan for URBMI. The copay rates increased for Class B of Basic Medical Insurance Drug Catalogue. (Hanzhou Municipal Labor and Social Security Bureau, 2009) Less than one year after this changes, Hangzhou Municipal Government enforced a revised version of "Hangzhou Basic Medical Security Regulation" including the changes below; (Zhejiang News, 2010)

(1) One-time initial investment for outpatient services was no long required for retirees.

(2) URBMI became available for rural residents.

(3) Medical Saving Accounts for flexible employees were set up.

[2] The child, people aged younger than 18 years old.
[3] The elder, people aged older than 60 years old.

Further changes of Regulation were made in 2010 and have been enforced since January 1, 2011. One main adjustment was to combine URBMI with NRCMS, which was called Basic Medical Insurance for Urban and Rural residents. Individuals, district and municipal governments together were responsible for the premiums of either of the two package plans, (1) 1200-Yuan plan, (2) 800-Yuan plan. For impatient services, the ceiling was 150,000 Yuan and the copay rate above that was 70%. The threshold did not change and the copay rates were higher in community health centers compared with higher-level hospitals, but were lower compared with UEBMI. For outpatient services, one threshold was paid first by out-of-pocket payments. And, for the 1200 level, copay rates for 3rd, 2nd, and 1st health facilities are 40%, 50% and 70%; for the 800 level, 25%, 35% and 60% respectively. (Sunflower Insurance Websit, 2912)

3.1.2 Baoji

Enforced on July 1, 2010, "Baoji Urban Employee Basic Medical Insurance (UEBMI) Management Regulation" stipulated that social basic insurances were only eligible for inpatient services. The thresholds for the designated health facilities within Baoji city district were 150 Yuan, 400 Yuan and 600 Yuan for 1st, 2nd and 3rd level hospitals, while the thresholds for out-of-district hospitals were 400 Yuan, 600 Yuan and 800 Yuan. The ceiling was 130,000 Yuan, and the spending above this amount was reimbursed from Medical Financial Assistance until it reached 200,000 Yuan. The copay rates had 2% difference for facilities within or outside the city district, namely 92%, 90%

and 88% for 3rd, 2nd and 1st level hospitals within the area, but 90%, 88% and 86% for those same level hospitals outside the area. The rates increased by 2% for retirees. The cost of medicines in Class A of Basic Medical Insurance Drug Catalogue was covered directly, while drugs in Class B were available for copayment after the initial 15% out-of-pocket payments. (Baidu Wenku, 2011) Moreover, seven types of NCDs were considered for outpatient copayment, including diabetes, primary hypertension, coronary atherosclerotic heart disease, etc.

For Urban Resident Basic Medical Insurance (URBMI), individual payments were the major source of contributions; in particular, residents were required to pay 200 Yuan per year, but 30 Yuan in terms of children. The threshold for inpatient copayment was 600 Yuan, 480 Yuan and 300 Yuan for 3rd, 2nd, 1st level health facilities respectively; the thresholds dropped to 300 Yuan, 200 Yuan and 100 Yuan for children. The copay rates varied for different levels of health facilities and rates decrease by 10% for designated health facilities outside Baoji city district compared with those within the district.

3.2 Essential Medicine System

Since January 1st 2011, the Essential Medicine Scheme has been implemented in primary health facilities in Hangzhou. The scheme was first enforced in five county-level districts in February 2010 - Shangcheng District, Xiacheng District, Gongshu District, Lin'an City and Tonglu County. During the transitional stage from February to July,

non-essential medicines treating six types of NCDs were allowed to be sold in community health centers, but the volume and revenues from these medicine sales were restricted. During the perfection stage, most community health centers were only allowed to use up the stored non-essential medicines for the six NCDs. Until the time when data was collected, Essential Medicine Scheme was only implemented in public primary health facilities including community health centers and stations, but not in higher-level hospitals.

The Essential Medicine Scheme was introduced to Baoji in December 2009. All primary health facilities were required to only stock and sell essential medicines with zero mark-up, while other levels of health facilities were requested to stock and use certain volumes of essential medicines.

3.3 Prevalence of Non-communicable Diseases

Non-communicable diseases (NCD) account for 83% of all deaths in China, among which cardiovascular diseases and cancers contributing 38% and 16% respectively (World Health Organization, 2010). In particular, for the elder aged 60 or above, 92% of deaths were caused by non-communicable diseases, among which, 50.7% were due to cardiovascular diseases (World Health Organization, 2011).

3.3.1 Prevalence Rate of Self-Reported NCDs

Table 5 shows the prevalence rate of self-reported NCDs in Hangzhou and Baoji. Generally, the rate in Hangzhou was higher compared with Baoji. In Hangzhou, the

prevalence rate was without large changes over time; while in Baoji, the rate increased between 2009 and 2012 but then leveled off between 2012 and 2013. The differences between the two cities as well as changes over time in both cities were both statistically significant with p-values smaller than 0.01.

Table 5: Prevalence Rate of Self-Rated NCDs in Hangzhou and Baoji, 2009, 2012 and 2013

	Hangzhou			*Baoji*[2]		
	2009	**2012**	**2013**[1]	**2009**	**2012**	**2013**[1]
Prevalence	32.3%	35.4%	35.5%	21.7%	29.1%	30.0%
	(879)	(1023)	(1026)	(567)	(794)	(784)
Total[*]	2718	2893	2889	2609	2726	2616

[*]The total number of participants;
[1]The difference over time in either city was statistically significant ($p<0.01$);
[2]The difference between Hangzhou and Baoji was statistically significant ($p<0.01$).

China has been an ageing society since 1999 and with 700 million people aged 60 or over in 2009, the older population is expected to reach 2 billion by 2050, which will account for 30% of the total population. (Song, Ma, & Yi, 2013) Age is generally considered a risk factor for NCDs; therefore, differences in the age composition of the two cities may account for the difference in NCD prevalence rates. Table 6 lists the age composition over time in the two cities. In Hangzhou, the above 60-year age group increased by 5.6%, and increased 6.9% in Baoji.

Table 6 Population Age Structure by Major Age Groups in Hangzhou and Baoji, 2009, 2012 and 2013 (% of the total population)

Age groups	***Hangzhou***			***Baoji***		
	2009	**2012**	**2013**	**2009**	**2012**	**2013**
0-20	13.8%	12.5%	13.6%	16.8%	14.4%	14.0%
	(374)	(363)	(393)	(438)	(393)	(366)
21-40	25.8%	23.3%	23.2%	27.8%	22.9%	23.3%
	(702)	(674)	(671)	(725)	(624)	(610)
41-60	31.9%	29.1%	29.0%	32.9%	33.5%	33.3%
	(868)	(841)	(839)	(858)	(913)	(871)
61 and above	28.5%	35.1%	34.1%	22.5%	29.2%	29.4%
	(774)	(1015)	(986)	(587)	(796)	(769)
Total*	2718	2893	2889	2609	2726	2616

*The total number of participants.

In the meantime, the NCD prevalence rate also increased within certain age groups. From Table 7, the prevalence rate in the above-60-age-group in Baoji climbed 14.4%; from 51.3% in 2009 to 65.7% in 2013. In Hangzhou, a small increase of 3.5% occurred between 2012 and 2013. Therefore, the change in the age distribution was one but not exclusive factor accounting for the increase in the prevalence rate of NCDs over time. When controlling for age, the p-values for the prevalence rate change over time were still less than 0.01 in both cities.

Table 7: Self-Reported NCD prevalence rate within Major Age Groups in Hangzhou and Baoji, 2009, 2012 and 2013 (% of the age group population)

Age groups	***Hangzhou***			***Baoji***		
	2009	**2012**	**2013**	**2009**	**2012**	**2013**
0-20	0.5%	0.8%	1.0%	1.1%	1.5%	1.6%
	(2)	(3)	(4)	(5)	(6)	(6)
21-40	4.7%	2.5%	4.2%	4.7%	5.3%	4.9%
	(33)	(17)	(28)	(34)	(33)	(30)
41-60	33.9%	33.3%	30.8%	26.5%	27.1%	27.8%
	(294)	(280)	(258)	(227)	(247)	(242)
61 and over	71.1%	**71.2%**	**74.6%**	**51.3%**	**63.8%**	**65.7%**
	(550)	**(723)**	**(736)**	**(301)**	**(508)**	**(505)**
Total*	32.3%	35.4%	35.5%	21.7%	29.1%	30.0%
	(879)	(1023)	(1026)	(567)	(794)	(784)

* % of total population

3.3.2 Prevalence Rate of Self-Reported Illness

The prevalence rate of self-reported illness in the last two weeks did not change over time, but differences existed between Hangzhou and Baoji (Table 8). The rate of self-reported illness was around 80% in Hangzhou, among which 90% were related to their chronic diseases (data not shown). In Baoji, less NCD patients reported illness also with 90% related to their chronic diseases (data not shown) however, there was an increase of self-reported illness of 8.2% from 2009 to 2013 in Baoji.

Table 8: Prevalence Rate of Self-Reported Illnesses by NCD Patients in Previous Two Weeks in Hangzhou and Baoji, 2009, 2012 and 2013

Self-reported illness	*Hangzhou*			*Baoji*[1]		
	2009	**2012**	**2013**	**2009**	**2012**	**2013**
Prevalence	76.2%	81.6%	77.5%	58.6%	58.4%	66.8%
	(670)	(835)	(795)	(332)	(464)	(524)
Total*	879	1023	1026	567	794	784

* Total number of patients with NCD.

[1]The difference between Hangzhou and Baoji is statistically significant.

3.4 Use of Outpatient Services by NCD Patients

When feeling not well, over 90% of people chose to receive some treatments (data not shown), however, some chose to treat themselves while some chose to refer to doctors.

3.4.1 Type of Health Care for General Illness

Table 9 shows types of health care NCD patients used when not feeling well. This choice of health care changed across time with statistical significance in Hangzhou ($p<0.01$). As seen in Table 9, more people increasingly engaged in self-medication over time in Hangzhou. However in Baoji, the pattern was U-shaped; from 2009 and 2012, less patients utilized self-medication, but self-medication rates increased again after 2012.

Table 9: Types of Health Care Sought by NCD Patients in the Last Two Weeks in Hangzhou and Baoji, 2009, 2012 and 2013

Type of Health Care	*Hangzhou*			*Baoji*		
	2009	2012	2013[1]	2009	2012	2013
Self-medication*	**49.2%**	**60.5%**	**74.1%**	86.8%	73.6%	80.4%
	(315)	**(487)**	**(539)**	(282)	(326)	(365)
Doctor-visit only	**50.5%**	**39.3%**	**24.3%**	13.2%	26.6%	17.7%
	(325)	**(316)**	**(177)**	(43)	(118)	(132)
Total**	640	805	727	325	443	496

*Self-medication includes self-medication only, and self-medication and doctor-visit.
**Total number of patients with NCDs receiving any treatment.
[1]The difference over time in Hangzhou is statistically significant ($p<0.01$).

3.4.2 Outpatient Visits for General Illness

The variable measuring number of outpatient visits paid by NCD patients in the past two weeks offers information on whether people ever visited a doctor when not feeling well. The number decreased by 12% in Hangzhou between 2012 and 2013. The situation remained fairly constant over time in Baoji (Table 10). From Tables 9 and 10, there might exist a change in types of health care. In particular, patients first used self-medication together with outpatient care; but then gradually evolved to only rely on themselves for self-medication.

Table 10: Outpatient Visits by Patients with NCDs in Previous Two Weeks in Hangzhou and Baoji, 2009, 2012 and 2013

Use of Outpatient	*Hangzhou*			*Baoji*		
Services	2009	2012	2013	2009	2012	2013
Outpatients-visits	**67.5%**	**65.8%**	**53.8%**	36.6%	39.3%	37.1%
	(432)	**(530)**	**(391)**	(119)	(174)	(184)
Total*	640	805	727	325	443	496

*Total number of patients with NCDs receiving Treatment

3.4.3 Outpatient Visits for Non-Communicable Diseases

Previously we looked at outpatient services for general illness; however for this section we will focus on outpatient services just for chronic diseases. Table 11 shows the number of outpatient visits by NCD patients for their chronic diseases in the last 3 months in Hangzhou and Baoji, the difference was obvious ($p<0.001$). Seen in Table 11, in Hangzhou, about 50% of NCD patients visited doctors at least once in the last 3 months; while in Baoji, half of patients did not see doctors at all.

In addition, statistically, the frequency of outpatient visits changes over time in Hangzhou ($p<0.01$) but not in Baoji. In particular, more patients visited doctors more than once per month in the last three months (Table 8). And in Baoji, more patients chose to visit doctors regularly over time (Table 11).

Table 11: The Number of Outpatient Visits for NCDs within 3 Months in Hangzhou and Baoji, 2009, 2012 and 2013

Number of Outpatient Visits	*Hangzhou*			*Baoji*		
	2009	2012	2013	2009	2012	2013
0 visits	23.2%	17.1%	12.2%	**54.9%**	**52.3%**	**45.2%**
	(204)	(175)	(125)	**(311)**	**(415)**	**(354)**
1-3 visits	**42.1%**	**53.4%**	**54.2%**	28.4%	33.5%	38.4%
	(370)	**(546)**	**(556)**	(161)	(266)	(301)
4-6 visits	16.2%	12.1%	19.8%	5.1%	4.4%	7.1%
	(142)	(124)	(203)	(29)	(35)	(56)
7 visits and over	10.4%	12.1%	12.0%	3.5%	5.8%	5.7%
	(91)	(124)	(123)	(20)	(46)	(45)
Total*	879	1023	1026	567	794	784

*Total patients with NCDs

3.4.4 Health Facility Preference for NCD Patients

In terms of health facility preference for outpatient services, NCD patients have different priorities in the two cities. Specifically, in Hangzhou, over 50% of patients chose community health facilities, while around 30% preferred hospitals (Table 12). On the other hand, most patients in Baoji referred to high-level hospitals, but presented more positive changes between 2012 and 2013 – a 10.3% decrease of outpatient visits to hospitals and a 7.2% increase to community health centers (Table 12).

Table 12: Outpatient Services from Different Health Facilities for Patients with NCDs in Hangzhou and Baoji, 2009, 2012 and 2013

Health	Hangzhou			Baoji		
Facilities	2009	2012	2013	2009	2012	2013
CHC&S*	**50.5%(218)**	**57.7%(306)**	**50.4%(197)**	26.1%(31)	**27.6%(48)**	**34.8%(64)**
Hospital	**39.6%(171)**	**32.1%(170)**	**37.3%(146)**	45.4%(54)	**50.0%(87)**	**39.7%(73)**
Others**	8.6%(37)	10.2%(54)	10.7%(42)	28.6%(34)	30.5%(53)	23.4%(43)
Total***	432	530	391	119	174	184

*CHC&S, community health center and stations;
**Others include traditional hospital, military hospital, private hospital and private clinics hospital outside Baoji city area (Baoji);
***Total number of patients with NCDs seeing doctors at least once within the two weeks.

The loss of patients from community health centers between 2012 and 2013 in Hangzhou were dispersed among various health care facilities. For patients insured with URBMI, there was an increase in the Others category (majorly traditional hospitals), while for those insured by UEBMI, the shift was from community health centers to city-level or district-level hospitals (Table 13) but the difference was not statistically significant.

Table 13: Outpatient Services to Different Health Facilities for Patients with NCDs Insured with URBMI and UEBMI in Hangzhou, 2009, 2012 and 2013

	URBMI			*UEBMI*		
	2009	2012	2013	2009	2012	2013
CHC&S	53.3%(40)	57.5%(42)	47.8%(22)	49.9%(173)	58.4%(255)	51.4%(167)
Hospitals	40.0%(30)	32.9%(24)	30.4%(14)	39.5%(137)	31.8%(139)	38.5%(125)
Others*	5.3%(4)	11.0%(8)	19.6%(9)	9.2%(32)	9.8%(43)	8.9%(29)
Total**	75	73	46	347	437	325

*Others include traditional hospital, military hospital, private hospital and private clinics hospital outside Baoji city area (Baoji);
**Total number of patients with NCDs seeing doctors at least once within the two weeks.

From Table 14, the same pattern occurred in both those insured with URBMI and UEBMI in Baoji, which was more obvious among UEBMI insurers, however the differences here were also not statistically significant.

Table 14: Outpatient Services to Different Health Facilities for Patients with NCDs Insured with URBMI and UEBMI in Baoji, 2009, 2012 and 2013

	URBMI			*UEBMI*		
	2009	2012	2013	2009	2012	2013
CHC&S*	23.5%(12)	**26.6%(17)**	**31.9%(22)**	30.2%(19)	**28.6%(30)**	**36.6%(41)**
Hospitals	39.2%(20)	**43.8%(28)**	**39.1%(27)**	49.2%(31)	**50.5%(53)**	**41.1%(46)**
Others**	35.3%(18)	29.7%(19)	26.1%(18)	22.2%(14)	27.6%(29)	20.5%(23)
Total	51	64	69	63	105	112

*Others include traditional hospital, military hospital, private hospital and private clinics hospital outside Baoji city area (Baoji);
**Total number of patients with NCDs seeing doctors at least once within the two weeks.

3.4.5 Change in use of CHC&S after the implementation of EMS

Between 2012 and 2013 in Hangzhou, the number of patients who visited doctors more than once per month in the last 3 months increased; and patients were more likely to refer to higher-level hospitals rather than community health centers. Explanations for these changes were highlighted through focus groups. Most patients mentioned they could not receive the whole set of medicines from community health centers since the implementation of essential medicine scheme (EMS) in early 2013. Community health centers were required to only sell essential medicines, while hospitals were not restricted by the regulations. When patients could not get medicines, most of them did not stay in CHC&S for medicine replacement but referred to hospitals. Most of healthcare providers

agreed the implementation of EMS influenced patients and affected health facility and healthcare providers.

> "Around 75% of patients would go to higher-level hospitals for drugs not available here (community health center), including some only for drugs not available here (community health centers), and some for all the medications." (A health care provider in Hangzhou, FGD)
>
> "Only patients very sensitive to prices would accept to change to essential medicines. A great many people considered the function of community health centers as prescribing drugs. But now drugs are not available here (community health center)." (A health care provider in Hangzhou, FGD)
>
> "XX (e.g. Acarbose tablet, Byer Aspirin) used to be available here (community health centers), but not any more since April or May (2013); so I have to go to XX (third tier hospital). Even though not considering the higher price there (hospital), it is not convenient and sometimes dangerous for us - the elder - to travel a long distance. And it is the most common drug!" (A Patient with a NCD in Hangzhou, FGD)

3.4.6 Source of Drugs for NCD Patients

Purchasing prescriptions is the main reason why NCD patients visited doctors. The location preference for purchasing drugs was quite different in the two cities ($p<0.01$) (Table 15). In particular, 63.4% of NCD patients in Hangzhou bought drugs from community health centers or stations, 21% from higher-level hospitals and 10% from drug stores. However, in Baoji, nearly 80% of patients chose drug stores.

Table 15: Outpatient Visits to Health Facilities for Purchasing Medicines by Patients with NCDs in Hangzhou and Baoji, 2013

Health Facilities	*Hangzhou*	*Baoji*[1]
Community Health Centers & Stations	**63.4% (387)**	8.6% (37)
Hospitals	21.6% (132)	6.8% (29)
Drug Stores	10.2% (62)	**77.6% (333)**
Others*	4.8% (29)	7.0% (30)
Total**	610	429

*Others include township health clinics, village clinics and private clinics.
**The total number of NCD patients answering this question.
[1]The difference between Hangzhou and Baoji is statistically significant (P<0.01).

Medicine purchasing behaviors were quite different in Hangzhou and Baoji, yet the two cities shared similar patterns when comparing two types of medical insurance. In particular, patients insured with UEBMI were more likely to refer to community health centers for drugs, while patients insured with URBMI were more likely to go to hospitals and drug stores (not statistically significant) (Table 16).

Table 16: Outpatient Visits to Health Facilities for Purchasing Medicines by NCD Patients Insured with URMBI and UEBMI in Hangzhou and Baoji, 2013

Health Facilities	*Hangzhou*		*Baoji*	
	URBMI	UEBMI	URBMI	UEBMI
Community Health Centers & Stations	**54.7%(35)**	**64.8%(330)**	**2.1%(3)**	**12.2%(34)**
Hospitals	25.0%(16)	21.0%(110)	8.4%(12)	5.7%(16)
Drug Stores	**17.2%(11)**	**8.8%(45)**	**84.6%(121)**	**73.8%(206)**
Others*	3.1%(2)	4.7%(24)	4.9%(7)	8.2%(23)
Total**	64	509	143	279

*Others include township health clinics, village clinics and private clinics.
**The total number of NCD patients answering this question.

3.4.7 Reasons for Location Preference

In both cities, most of the selected preferred locations were close to home-less than 30 minutes (Table 17), including CHC and drug stores but not for higher-level hospitals where the time cost ranged widely (data not shown).

Table 17: The Time Cost to preferred locations Visits for Patients with NCDs by Time Intervals in Hangzhou and Baoji (2013)

Time Required to Selected Preferred Locations	*Hangzhou*	*Baoji*[1]
0-10 minutes	72.1%(427)	67.4% (289)
10-30 minutes	17.1%(101)	22.4% (96)
31-60 minutes	7.4%(44)	6.8% (29)
≥ 61 minutes	3.4%(20)	2.1% (9)
Total *	592	429

*Total number of patients with NCDs answering this question;
[1]The difference between Hangzhou and Baoji is statistically significant.

Instead of convenience, diversity of stocked drugs may become the major reason of location preference for residents in Hangzhou (Table 18); 56% of people who chose hospitals indicated diversity to justify their choice (data not shown). On the other hand, more patients in Baoji gave more weight to the cost of medicine and copay rates (Table 18).

Table 18: Reasons for Location Preference of Patients with NCDs in Hangzhou and Baoji (2013)

Reason for the Location Preference	*Hangzhou*	*Baoji*
Convenience	67.8%(410)	55.5%(234)
Choices	16.5%(100)	5.5%(23)
Cost/Price	8.6%(52)	21.3%(90)
Copay Rate	2.5%(15)	12.8%(54)
Others	4.6%(28)	5.0%(21)
Total*	605	422

*Total number of NCD patients answering this question.

3.4.8 Different Preferences for Sources of Medicines by NCD Patients

In Baoji, focus group discussions (FGD) with patients showed that most of them visited drug stores rather than public health facilities for medicines, and most patients mentioned cheaper price in drug stores to justify their preference. However, in Hangzhou, most NCD patients preferred community health centers and stations. The most frequent attributes mentioned by patients include "convenience", "cheaper price", and "familiarity with healthcare providers", "being-treated-well", "without-long-waiting-time". Most healthcare providers in the FGD held the same opinions.

> "Look around here (hospital), within 500 meters in the street, there are five drug stores. Patients buy drugs there (drug store) instead of in our hospital. To be honest, sometimes I will buy drugs in drug stores too. It is cheaper." (A health care provider in Baoji, FGD)
>
> "Of course I go to drug stores to buy drugs. Drugs sold there (drug store) were much cheaper compared with hospitals. They (drug store) usually offer coupons or have discounts." (A patient with a NCD in Baoji, FGD)
>
> "It is more convenient here (community health centers). It is close to home and I do not need to wait for a long time. Hospitals are too crowded and with a long waiting time." (A patient with a NCD in Hangzhou, FGD)

"Drugs here (community health centers) are cheaper compared with big hospitals. The copay rate is higher here (community health center). I know doctors very well here (community health centers) and they are very familiar with my health condition. I am happy to come here (community health center) instead of big hospitals." (A patient with a NCD in Hangzhou, FGD)

3.5 Financial Measure of Outpatient Services

3.5.1 Percentage of Total Health Expenditure from Out-of-Pocket Payments

The total outpatient health expenditures did not change over time in Hangzhou. When considering inflation, the results seemed optimistic. In Baoji, the spending increased between 2009 and 2012 but then decreased ($p<0.01$) (data not shown).

Table 20 depicts that most patients in Hangzhou paid less than 25% of total expenditures from out-of-pocket, however in Baoji, the majority of patients paid more than 85% out of pocket. In both cities, more patients increasingly paid smaller shares from out-of-pocket payments.

Table 19: the Percentage of Total Health Expenditure from Out-of-Pocket Payments for NCD Patients in Hangzhou and Baoji, 2009, 2012 and 2013

	Hangzhou			Baoji		
	2009	2012	2013	2009	2012	2013[1]
0-15%	37.0%(149)	35.2%(172)	54.0%(207)	8.9%(18)	11.3%(28)	15.2%(32)
15-25%	20.8%(84)	27.7%(135)	20.4%(78)	2.5%(5)	2.8%(7)	4.3%(9)
25-45%	13.2%(53)	9.4%(46)	6.8%(26)	3.0%(6)	5.2%(13)	5.7%(12)
45-70%	5.5%(22)	7.2%(35)	5.2%(20)	2.5%(5)	5.6%(14)	7.1%(15)
70-85%	2.2%(9)	2.7%(13)	0.0%(0)	1.5%(3)	1.2%(3)	1.0%(2)
85-100%	21.3%(86)	17.8%(87)	13.6%(52)	81.8%(166)	73.8%(183)	66.7%(140)
Total*	403	488	383	203	248	210

*Total number of patients with NCDs recording total health expenditures and also out-of-pockets
[1]The difference over time in Baoji is statistically significant ($p<0.01$).

When comparing patients insured with UEBMI and those with URBMI, financial protection functions better for patients benefiting from UEBMI in both cities. From Table 20, most patients insured with UEBMI only paid less than 25%, while most patients.

Table 20: Percentage of Total Health Expenditure from Out-of-Pocket Payments for NCD Patients Insured with UEBMI and URBMI in Hangzhou, 2009, 2012 and 2013

	UEBMI			URBMI		
	2009	2012	2013	2009	2012	2013[1]
0-15%	43.7%(131)	39.9%(155)	59.3%(178)	20.5%(17)	15.3%(13)	39.3%(22)
15-25%	26.0%(78)	27.8%(108)	22.7%(68)	7.2%(6)	29.4%(25)	14.3%(8)
25-45%	13.7%(41)	7.0%(27)	6.0%(18)	13.3%(11)	18.8%(16)	8.9%(5)
45-70%	1.7%(5)	6.2%(24)	3.3%(10)	15.7%(13)	12.9%(11)	16.1%(9)
70-85%	0.3%(1)	2.6%(10)	0.0%(0)	8.4%(7)	3.5%(3)	0.0%(0)
85-100%	14.7%(44)	16.5%(64)	12.0%(36)	34.9%(29)	20.0%(17)	21.4%(12)
Total*	300	388	300	83(83)	85	56

*Total number of patients with NCDs recording total health expenditures and also out-of-pockets
[1]The difference over time in Baoji is statistically significant ($p<0.01$).

In Baoji, NCD patients insured with UEBMI paid less than patients insured with URBMI. (Table 21) Specifically, patients insured with UEBMI paid less from out-of-pocket payments each year.

Table 21: Percentage of Total Health Expenditure from Out-of-Pocket Payments in Hangzhou and Baoji, 2009, 2012 and 2013

	UEBMI			URBMI		
	2009	2012	2013	2009	2012	2013[1]
0-15%	15.0%(16)	13.5%(18)	20.0%(24)	1.1%	7.7%	8.1%
15-25%	2.8%(3)	5.3%(7)	6.7%(8)	2.3%	0.0%	1.2%
25-45%	4.7%(5)	5.3%(7)	6.7%(8)	1.1%	5.8%	4.7%
45-70%	2.8%(3)	8.3%(11)	5.8%(7)	2.3%	2.9%	9.3%
70-85%	2.8%(3)	0.8%(1)	1.7%	0.0%	1.9%	0.0%
85-100%	72.0%(77)	66.9%(89)	59.2%	93.1%	81.7%	76.7%
Total*	403	488	383	203	248	210

*Total number of patients with NCDs recording total health expenditures and also out-of-pockets
[1]The difference over time in Baoji is statistically significant ($p<0.01$).

In addition, spending patterns were different between hospitals and community health centers. In both cities, more patients paid less if visiting community health centers compared with those visiting hospitals. (Table 22)

Table 22: the Percentage of Total Health Expenditures from Out-of-Pocket Payments for Patients from CHC&S and Hospitals in Hangzhou and Baoji, 2013

	Hangzhou		*Baoji*	
	CHC&S	Hospital	CHC&S	Hospital[1]
0-15%	60.8%(113)	46.9%(69)	23.4%(18)	12.2%(10)
15-25%	20.4%(38)	20.4%(30)	2.6%(2)	8.5%(7)
25-45%	2.7%(5)	10.9%(16)	0.0%(0)	9.8%(8)
45-70%	3.8%(7)	4.8%(7)	3.9%(3)	13.4%(11)
70-85%	0.0%(0)	0.0%(0)	0.0%(0)	1.2%(1)
85-100%	12.4%(23)	17.0%(25)	70.1%(77)	54.9%(45)
Total*	186	147	77	82

3.5.2 Out-of-Pocket Payments

In terms of out-of-pocket payments, changes over time in both cities were statistically significant ($p<0.01$). In Hangzhou, most patients spent less than 100 Yuan,

and the percentage decreased as the amount increased (Table 23). In Baoji, the pattern was U-shaped with the peak falling in the 201-500 Yuan group, and the above 500-Yuan group increased from 12.6% in 2009 to 26.6% in 2013 (Table 23).

Table 23: Out-of-pocket Payments by Patients with NCDs in Hangzhou and Baoji, 2009, 2012 and 2013

Out-of-	*Hangzhou*			*Baoji*		
payments	2009	2012	2013[1]	2009	2012	2013[1]
0-50	42.4%(183)	28.9%(153)	29.4%(115)	13.4%(45)	12.6% (58)	10.3% (54)
51-100	14.6% (63)	17.7% (94)	14.1% (55)	16.0% (53)	8.0%(37)	9.8%(51)
101-200	10.9% (47)	13.2% (70)	10.2% (40)	20.2% (67)	16.7% (77)	18.5% (97)
201-500	8.3% (36)	11.5% (61)	10.0% (39)	**28.6% (95)**	**30.5%(141)**	**19.0%(100)**
501-1000	5.1% (22)	4.3%(23)	2.6% (10)	6.7%(22)	9.8%(45)	11.4% (60)
>1000	1.2% (5)	2.6%(14)	1.5% (6)	5.9%(20)	18.4% (85)	15.2% (80)
Total*	432	530	391	119	174	184

* Total number of patients with NCDs seeing doctors at least once within two weeks.
[1]The difference over time in Hangzhou and Baoji is statistically significant ($p<0.01$).

The patterns were similar for patients insured with URBMI and UEBMI in Hangzhou, and the percentage decreased as the amount increased. However, the slope was sharper for patients insured with UEBMI than URBMI (Table 24) and the two groups were not statistically different.

Table 24: Out-of-pocket Payments by Patients with NCDs Insured with UEBMI and URBM in Hangzhou, 2009, 2012 and 2013

	UEBMI			*UEBMI*		
	2009	2012	2013	2009	2012	2013
0-50	45.2%(157)	29.5%(129)	29.8%(97)	33.3%(25)	27.4%(20)	28.3%(13)
51-100	13.8%(48)	16.9%(74)	12.9%(42)	20.0%(15)	24.7%(18)	21.7%(10)
101-200	10.1%(35)	11.9%(52)	10.2%(33)	16.0%(12)	19.2%(14)	13.0%(6)
201-500	6.9%(24)	11.4%(50)	9.2%(30)	12.0%(9)	9.6%(7)	6.5%(3)
501-1000	4.3%(15)	3.7%(16)	2.8%(9)	5.3%(4)	6.8%(5)	0.0%(0)
>1000	0.9%(3)	2.7%(12)	1.8%(6)	1.3%(1)	2.7%(2)	0.0%(0)
Total*	347	437	325	75	73	46

*Total number of patients with NCDs seeing doctors at least once within two weeks.

In Baoji (Table 25), for patients insured with URBMI, the trends did not change over time with one peak in 201-500 Yuan group. For patients insured with UEBMI, the out-of-pocket payments reached the highest point between 100 and 500.

Table 25: Out-of-pocket Payments by Patients with NCDs Insured with UEBMI and URBM in Baoji, 2009, 2012 and 2013

	UEBMI			*URBMI*		
	2009	2012	2013	2009	2012	2013
0-50	11.1%(7)	11.4%(12)	6.3%(7)	15.7%(8)	16.7%(10)	15.9%(11)
51-100	12.7%(8)	8.6%(9)	9.8%(11)	13.7%(7)	8.3%(5)	10.1%(7)
101-200	**23.8%(15)**	**15.2%(16)**	**19.6%(22)**	17.6%(9)	18.3%(11)	15.9%(11)
201-500	**22.2%(14)**	**32.4%(34)**	**19.6%(22)**	**39.2%(20)**	**28.3%(17)**	**18.8%(13)**
501-1000	7.9%(5)	7.6%(8)	9.8%(11)	5.9%(3)	11.7%(7)	13.0%(9)
>1000	7.9%(5)	15.2%(16)	15.2%(17)	3.9%(2)	20.0%(12)	15.9%(11)
Total*	63	105	112	51	60	69

* Total number of patients with NCDs seeing doctors at least once within two weeks.

The out-of-pocket payment was also associated with the type of health facilities ($p<0.01$). In Hangzhou, 40% of patients visiting community health centers spent less than 50 Yuan; and the percentage decreased sharply as the amount increased (Table 26).

The payments in higher-level hospitals were spread evenly and decreased after 500 Yuan (Table 26). In Baoji, the peak fell into the 100-200 Yuan group for community health facilities; for hospitals the peak fell into the 200-500 Yuan group. (Table 26)

Table 26: Out-of-pocket Payments by Type of Health Facilities in Hangzhou and Baoji, 2009, 2012 and 2013 (Only for Patients with NCDs)

Out-of-pocket	*Hangzhou*		*Baoji*	
Payments	CHC&S	Hospital[1]	CHC&S	Hospital[1]
0-50	41.1% (81)	19.9% (29)	10.9% (7)	8.2% (6)
51-100	15.2% (30)	11.0% (16)	14.7% (9)	6.9% (5)
101-200	3.1% (6)	17.1% (25)	**23.4% (15)**	13.7% (10)
201-500	3.6% (7)	17.8% (26)	14.1% (9)	**24.7% (18)**
501-1000	2.5% (5)	2.7% (4)	12.5% (8)	11.0% (8)
≥ 1000	0.5% (1)	2.7% (4)	3.1% (2)	**23.3% (17)**
Total*	197	146	64	73

*Total, the total number of patients with NCDs not feeling well in previous two weeks.
[1]The difference between CHC&S and hospitals is statistically significant

3.6 Attitude Measures

3.6.1 Basic Medical Insurance Scheme

No significant difference of attitudes towards medical insurance exists between the two cities, with no changes happening over time in Baoji. But in Hangzhou, the satisfaction scores changed across time with statistical significance ($p<0.01$) (Table 28). In particular, over time, more patients felt dissatisfied rather than satisfied.

Table 27: Overall Satisfactions with Basic Health Insurance in Hangzhou, 2009, 2012 and 2013

	2009	2012	2013[1]
Very satisfied	8.1% (163)	11.3% (84)	11.6% (95)
Satisfied	60.5% (1531)	50.9% (462)	49.0% (410)
Neither Satisfied nor Dissatisfied	28.3% (494)	22.9% (210)	21.1% (196)
Dissatisfied	3.1% (45)	14.6% (113)	17.6% (137)
Very dissatisfied	0.0% (0)	0.4% (4)	0.7% (5)
Total[*]	828	529	843

[*] Total number of NCD patients answering this question.

[1]The difference over time in Hangzhou is statistically significant ($p<0.01$).

3.6.2 Benefit Packages Varied Across Population Characteristics

Most patients from FGD in Hangzhou mentioned the inequity across different types of medical insurances; in particular, the benefit package for retirees once working in state-owned enterprises was much better than those once working in private-owned enterprises.

> "The package of medical insurance scheme was so different. Huge difference exists between UEBMI and URBMI. Moreover, within UEBMI for retirees, differences also exist between those once working in state-owned companies and those in private-owned companies. For example, above 1,200 for outpatient services, the copay rate for the state-owned employees was still 95%, but for us, the private-owned employees, we have to pay by ourselves." (A patient with a NCD in Hangzhou, FGD)

> "Another issue is the accumulation of personal account. For example, I have got 100 Yuan left in personal account from last year. This year I used up 2,000 Yuan, the 100 Yuan was consumed as personal account with no copay rate." (A patient with a NCD in Hangzhou, FGD)

> "We all have contributed our youth to the country. Why we are treated so different. The regulation should remain the same between state-owned retirees and private owned retires, but be categorize according the

age. The elder people become, the more likely they need more medical care." (A patient with a NCD in Hangzhou, FGD)

In Baoji, outpatient services were not covered by basic medical insurance; instead the Chronic Disease Management Plan was established to cover outpatient care for NCD patients. However, nearly all patients from our focus groups mentioned the enrollment requirements were very strict and the application procedure was complicated.

"The requirements for enrollment in the Chronic Diseases Management Plan are so strict. You can check the requirements. Qualified patients must be dying, and what the point to apply then?" (A patient with a NCD in Baoji, FGD)

"The procedure to get reimbursed takes a long time, and even longer for the application of Chronic Disease Management Plan. It was not convenient." (A patient with a NCD in Baoji, FGD)

3.6.3 Regulations of Prescription Drugs

In addition, nearly every healthcare provider and many NCD patients mentioned the prescription volume issue. Due to medical insurance regulations, general physician (GP)was only allowed to prescribe a 3-day volume for emergency diseases, a 7-day volume for chronic diseases and a 30-day-volume for hypertension and diabetes, etc. Most health care providers criticized the strict regulation, and they referenced medical insurance regulations as too restrictive, not flexible and not practical.

"The doctors (health care providers from community health center) can only prescribe XX for one month, exactly one month, which means that I have to come back (community health center) on the day next month, early allowing one day earlier. The thing is if I have something to do on that day, I

do not have medications for that day." (A patient with a NCD in Hangzhou, FGD)

"At one time, I want to get some plasters for the shoulder paints. The doctor said he could only prescribe one patch for one day. But I have two shoulders, right? And maybe I also want to apply to my legs or waist. But it is not allowed." (A patients with a NCD in Hangzhou, FGD)

"The medical insurance regulations require very strict control over the volume of medicines. But for the aged patients, sometimes they happened to drop one tablet. What should they (patients) do? They literally do not have drugs. What should we (doctors) do? If we prescribe, we will be fined. If not, patients will complain about us and then our health facility is fined anyway by Bureau of Medical Insurance." (A health care provider in Hangzhou, FGD)

"For patients with hypertension, in summer they cannot use up their drugs, but we recommend them to prescribe anyway so that they can place them in stock for the future use." (A health care provider in Hangzhou, FGD)

"Another problem is that most patients use multiple drugs, which have different package sizes. Maybe one have 7 tablets, another one have 12 tablets. The least common multiple will not be divided by one month. So the two combination cannot always match, meaning patients have always already used up one but have another left." (A health care provider in Hangzhou, FGD)

3.6.4 Regulations of Second-Line Prescription Medicines

Some patients mentioned that for some drugs, they had to visit higher-level hospitals first to get the prescriptions of these drugs, and only then GP from community health centers were allowed to prescribe these drugs. Healthcare providers mentioned prescription restriction to second and third line medicines and referenced evidence-based medicines as explanation. In particular, GP from CHC were allowed to prescribe second and third line medicines, but only if GP could provide first-line medicines being

used within 6 months. Evidence of the first-line prescription should be scanned and uploaded to a computer. Without evidence, the prescription was seen as irrational use, and health facilities would be fined. Since the procedure to justify the prescription was complex and time-consuming, GP from CHC usually waited until the higher-level hospitals prescribed the drugs.

> "GP here (community health centers) was not willing to prescribe XX (Irbesartan tablets, Perindopril tablet), because they would be fined otherwise. I need to provide the prescriptions from higher-level hospitals first. I do not want to bother them. But I have taken this drug for years. Why doctors in community health centers are not allowed to prescribe XX. Why I had to travel long distance to hospitals suddenly?! I do not want to go to hospitals. Hospitals were too crowded and with long waiting time. Here it is more convenient for the elder." (A patient with a NCD in Hangzhou, FGD)

> "It is not that prescribing second-line medicines is wrong. But we need to provide evidences that first-line medicines have already been used. But the procedures of uploading the evidences to computers are very complicated, and the computer system is not flexible and difficult to operate. And sometimes patients cannot provide or lost relative prescriptions, so we cannot access to evidence." (A health care provider in Hangzhou, FGD)

> "For example, one patient with chronic diseases has used second-line drugs for a while, and then they personally decide to stop medication for a while since they felt better. After one or two months, he started again, but we are not allowed to prescribe second-line drugs to him. They have to refer to high-level hospitals." (Health provider in Hangzhou, FGD)

> "What is worse is that when patients get prescriptions from higher-level hospitals, most of the drugs are second-line or third-line, which usually are not available in community health centers and are not allowed to prescribe by us." (Health provider in Hangzhou, FGD)

3.6.5 Access to Medicine

In the household survey, a list of questions requested respondents to rate their experiences related to access to health services and medicine, including whether health expenditure increased in the previous year compared to the year before that, the price of medicine increased, the quality of medicine improved, etc. (Table 28 & 29).

Table 28: Whether Healthcare Expenditures Increase or Decrease in Hangzhou and Baoji, 2013 (Only for Patients with NCDs)

	Hangzhou	Baoji
Greatly increased	11.2% (93)	23.9% (205)
Increased	22.7% (191)	39.1% (336)
Unchanged	49.3%(412)	24.6% (211)
Decreased	5.5% (46)	4.8% (41)
Greatly decreased	0.9% (7)	0.2% (2)
Total*	838	859

* Total, the total number of respondents with NCDs

Table 29: Whether Medicine Price Increase or Decrease in Hangzhou and Baoji, 2013 (Only for Patients with NCDs)

	Hangzhou	Baoji
Greatly increased	8.2% (46)	51.8% (219)
Increased	19.7% (111)	36.9% (156)
Unchanged	42.4%(239)	22.9% (97)
Decreased	11.2% (63)	4.7% (20)
Greatly decreased	0.9% (5)	0.0% (0)
Total*	564	419

* Total, the total number of respondents with NCDs

Most people rated positively. More valuable information could be acquired from focus group discussions, which are quoted below. Several patients from FGD in Hangzhou mentioned efficiency and quality of medicines from community health

centers decreased compared to the previous year, and health providers also indicated their concerns about the quality and safety of some drugs.

> "Besides the restriction of the type of medicines, the quality of medicines makes the situation even worse. The only principle to select essential medicine is the price being as low as possible. To some extent, price assures the quality. For example, for the 1 Yuan normal saline, do your dare to use. Even you do, doctors are scared to prescribe in terms of the accompanied risks undertaken. In the meantime, pharmaceutical companies refuse to produce drugs with little or no profits. Therefore, permitted medicines are out of stock too." (Health provider in Hangzhou, FGD)

4 Discussion

In both Hangzhou and Baoji, around 30% of residents reported suffering from chronic non-communicable diseases; however the health seeking behavior was quite different between the two cities. In general, community health centers and stations were more widely used by patients with NCDs in Hangzhou than in Baoji. Both total health expenditures and out-of-pocket payments were smaller in Baoji compared with Hangzhou.

4.1 Limitations

The study was implemented only in urban areas, which limited generalizability to the entire city. For focus group discussions, the subjects were contacted and selected by healthcare providers, which may have systematically affected results. For example, in Hangzhou participants of FGD were patients frequently visiting CHC, so they might tend to speak up more regarding community health centers. Since the sample size of the

qualitative study remained relatively small, results may not be generalizable. In addition, household surveys were self-reported without direct supplementary measures, which may result in recall bias, especially for the expenditure data, e.g. total health expenditure, out-of-pocket payments, although we encouraged subjects to refer to receipts or paper records for this data. Additionally, self-reported studies tend to be influenced by participants' moods and feelings during the interview, as well as social desirability, especially for attitude and evaluation questions. Furthermore, most NCD patients in Baoji chose private drug stores instead of public health facilities for medicines and since the health expenditure we collected was for outpatient services, their medicine spending was not covered in the data.

4.2 Discussion of Findings

4.2.1 Disease Burden of NCDs

Currently, chronic non-communicable diseases account for up to 63% of deaths globally, among which 80% are from developing countries. (World Health Organization, 2011) The major concerns are cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. (Boutayeb & Boutayeb, 2005) In this study, the prevalence rate of self-reported NCDs was around 30% in both Hangzhou and Baoji, a little higher in Hangzhou. Since the data was self-reported, the higher prevalence rate may be due to better public screening in Hangzhou. There also was an increase in NCD prevalence rate in Baoji over time. The improvement in surveillance for hypertension and diabetes in

Baoji may contribute to the increase in the prevalence rate of NCDs. One survey conducted in three cities of northeast China reported 29% of urban population had hypertension, but more than 60% of patients were not aware of their diseases. (Tang, Ehiri, & Long, 2013)

The increase of the prevalence of NCDs is strongly associated with aging of the population. NCDs disproportionately affect those aged 60 and older, though 25% of NCD deaths are among people under the age of 60. (Bloom, Cafiero, & Jane-Llopis, 2012) Based on the data collected, the elder (those aged 60 or above) accounted for more than one third of the total urban population. What was worse, the prevalence rate for those aged 60 and above increased constantly, especially for Baoji from 51% in 2009 to almost 66% in 2013. In terms of the reason, the rapid urbanization, the spread of unhealthy lifestyles, as well as more effective screening for NCDs, and the increased awareness of NCDs by urban residents may all contribute to this increase.

4.2.2 Health Seeking Behavior for patients with NCDs

The appropriate use of medicines may reduce 80% of the burden of NCDs. (Abegunde, Essential Medicines for Non-communicable Diseases) However, the majority patients with NCDs cannot access medicine. It is generally known that the poor are less likely to have access to health services. Many studies focus on the inequality of resources between rural and urban areas, but this study focuses on urban city areas, and shows an obvious gap between health services needed and health services actually used

still exists. More patients use self-medication in Baoji than Hangzhou, but increasingly more patients in Hangzhou used self-medication over time. Though self-medication may highlight the active role of patients and relieve the pressure of higher-level hospitals, there are potential risks to self-medication, and has been considered as one reason for incorrect use of medicines. (Ruiz, 2010; World Health Organization, 2010) In addition, fewer patients in Hangzhou visited doctors between 2012 and 2013, which projected that patients may gradually shift to self-medication. The location preference for outpatient services was quite different between cities. In Hangzhou, more than half of patients would visit community health centers, but in Baoji, more patients preferred hospitals. Patients in Hangzhou were more likely to trust GP in community health centers and GP were more likely to feel respected and confident about their work.

Furthermore between 2012 and 2013 in Hangzhou, patients visited doctors more frequently, and more patients chose to go to hospitals rather than community health centers and stations. From focus group discussions, most patients and healthcare providers reflected that since the implementation of Essential Medicine Scheme, many common drugs were no longer available in community health centers, so most patients chose to refer to higher-level hospitals, which also increased the frequency of outpatient visits. However, considering that the essential medicine scheme was just implemented in Hangzhou, the results may only reflect its short-term effects, and further studies may be needed to capture long-term effects.

One survey conducted in 40 countries showed that generic medicines for NCDs were available in 36.0% public and 54.7% private sectors. (Gelders & et al., 2006) Furthermore, private sectors prefer original brands to generic products and availability is better in private sectors; but the price for generic medicines are 2-3 times more expensive in private sectors. (Gelders & et al., 2006) One research study involving 37 countries and districts, showed that availability of hypertension medicines were very low in China. (Gelders, Ewen , & et al., 2006) For diabetes, the availability of glibenclamide in China was very low in public sectors (30%), while India, Malaysia and Morocco achieved 100% availability; the availability of metformin was extremely low in many countries including China. (Gelders, Ewen , & et al., 2006) In the urban areas of this study, medicines meet patients' basic needs, but the question was where NCD patients would go for drugs; public or private sectors, hospitals or community health centers? The preference and situations in two cities were quite different. In Hangzhou, two thirds of residents were more likely to go to community health facilities, while up to 80% of people in Baoji would rather choose private drug stores. When choosing where to go for medicines, people said convenience was a top priority. In both Hangzhou and Baoji, more than 70% of the chosen locations were within a 10 minute walk, and 90% were within a 30 minute walk. In Hangzhou, the outpatient services were covered by medical insurance, and higher copay rates in community health centers and stations attracted patients. In Baoji, drug stores were distributed very widely; outpatient services

were not covered by basic medical insurance as in Hangzhou. Therefore, patients paid medicines mostly from out-of-pocket payments, and private drug stores in Baoji offered cheaper prices by various pricing strategies, e.g. discounts, coupons to attract patients. In 2011, Baoji municipal government implemented Chronic Diseases Management (CDM), which included outpatient services for seven non-chronic diseases with 400-Yuan threshold and 70% copay rates however, enrollment requirements were strictly restricted to patients with advanced stages, so most patients cannot benefit from CDM.

4.2.3 Healthcare Expenditure for Patients with NCDs

The national income loss from cardiovascular diseases and diabetes in 2005 was $18 billion in China, $9 billion in India and $43 billion in Brazil, (Abegunde, Essential Medicines for Non-communicable Diseases) and the cumulative loss between 2005 and 2015 would be $558 billion in China. (Abegunde, 2007) For most developing countries, medications are the leading component of household healthcare expenditure, which is usually from out-of-pocket payments. (Abegunde, Essential Medicines for Non-communicable Diseases) In most countries, NCD medicines are not covered in the insurance package, and the long-term medication therapy often impoverishes households.

In the research conducted by Gelders and Ewen, the median price ratio (MPR) for public procurement varied widely across countries and also between different drugs within the country. (Gelders, Ewen , & et al., 2006) In this study, five drugs for

hypertension were studied. For China, the prices of the four were slightly higher in the public sector than private sector, and the affordability was similar or slightly higher in the public sector. (Gelders, Ewen , & et al., 2006)

Based on data from this study, total health expenditure for outpatient services did not change across time; and patients paid less from out-of-pocket payments in both cities across time. For most patients in Hangzhou, less than 25% of total health expenditures were from out-of-pocket payments; but in Baoji, most patients paid more than 85% of total expenditures out-of-pocket. The expenditure pattern varied among different health facilities. In Hangzhou, the results were quite straightforward; patients visiting community health centers paid smaller shares of total expenditures compared with patients visiting high-level hospitals. But the results in Baoji were complicated; more patients from community health centers paid less than 25% and meantime paid more than 85% of total health expenditures. Further studies may be needed to figure out the reason behind.

4.3 Conclusions

The prevalence rate of self-reported NCDs was higher in Hangzhou, which may be due to better surveillance for hypertension and diabetes in Hangzhou. NCD patients in Hangzhou preferred community health centers to higher-level hospitals for outpatient services and prescriptions, while patients in Baoji were more likely to refer to hospitals for outpatient services and private drug stores for medicines. The preference for

prescription was partly because outpatient services were covered in Hangzhou with higher copay rates in community health centers compared with hospitals; and medical insurance in Baoji did not cover outpatient care and prices were generally cheaper in drug stores than public health facilities. Between 2012 and 2013 in Hangzhou, patients visited doctors more frequently and more chose to refer to hospitals, which was partly due to the short-term effect of the Essential Medicine Scheme.

Appendix A

Household Survey of Health Services and Pharmaceutical Utilization (2009[1], XX City[2])

Coding: City□ District□□ Residents' Committee□□ Household□□

Social Security Number □□□□□□□□□□□□□□□□□□

ID Numbers: □□□□□□□□□□□□□□□□□□

1. Full Name of Head of Household: _____
2. Contact Telephone Number:
3. Number of Registered Population in the Household:
4. Address: _____, City
5. Survey Date: _____ (DD/MM/YYYY) Time: _____

Time of filling the form:_____ (DD/MM/YYYY) Signature of Investigator:
Time of Verification:_____ (DD/MM/YYYY) Signature of Verifier:

Investigation Greetings:

Dear Sir/Madam: Hello! We are investigators of Household Survey of Health Services and Pharmaceutical Utilization. The purpose of this survey is to collect information about the health status, medical insurance and health services utilization of residents, and to evaluate the accessibility of medicines, which would provide evidence to improve the health care system in XX city. Your cooperation would be appreciated. According to the Law of Statistics of the People's Republic of China, all of your personal information and your answers to this survey would be kept confidentially and would only be used for our analysis. We hope you would answer the following questions depending on the actual situation. Thank you very much for your cooperation!

[1] The changes in 2012 household survey are listed below,

Under the occupation question, the retired, one sub group, is separated from other types in 2012 but not in 2009;

The insurance types enrolled in are listed in more detailed subcategories in 2012 instead of general categories in 2009;

Two question are deleted in 2012, which querying about the pathway to access the information of health insurance, and who pay for the premiums.

[2] Differences between Hangzhou City and Baoji City are listed below.

The subcategories of URBMI and UEBMI are not exactly the same in the two cities. In detail, UEBMI in Baoji consists of two groups – for employees generally and for the retired specifically, while UEBMI in Hangzhou consists of three groups in 2012 – for those enrolling individually besides the two. URBMI in Baoji includes three – for residents generally, children and college students specifically; but in Hangzhou, there are programs specifically for the retired in 2012, and the group for residents in general are divided into two parts – the one with 800 premium and the other one with 1200 premium.

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
A. Individual's Basic Information(A1-A8.5 should only be answered by the head of household or insider)		
A1	Full Name of household members: **(Registered members of household only, the head of household was defined as 01)**	
A2	Relationship to the head of household:(1)Head of household (2)Spouse (3)Son/daughter (4)Grandchild (5)Parent (6)Grandparent (7)Brother/sister (8)Daughter-in-law/son-in-law (9)Other	
A3	Gender: (1)Male (2)Female	
A4	Age: **(First birthday after born was defined as 1 year-old, interviewer should use birth date to verify. Please skip to A7 if the interviewee was under 7 years old)**	
A5	Marital status: (1)Unmarried (2)Married (3)Divorced (4) Widowed (5)Remarried (6)Other	
A6	Educational background: (1) Without any schooling (2) Primary school education (3) Junior high school education (4) Senior high school/technical school education (5)Secondary school/secondary technical school education (6) College education (7) University degree or higher qualification	
A7	Profession **(Multiple choices)**: (1)Farmer (2) Labourer (unskilled) (3)Business(self-employed) (4)Medical professional (5)Service industry (6)Teacher (7)School student (8)Enterprise employee (9)Civil servant or government-owned institutions employee (10) Unemployed (11)Other (Please specify) (12) Retiree	
A8.1	What kind of medical insurance have you joined?**(Multiple choices)**: (1)Urban Employees' Basic Medical Insurance (2) Urban Residents' Basic Medical Insurance (3) Urban Residents' Basic Medical Insurance (4)Private health insurance (5)Other (please specify) (6)Uninsured	
A8.1a	What is the pathway to access the information of health insurance? (**Multiple choices)**: (1) Newspaper (2) Radio (3) TV (4) Community Poster (5) Lectures (6) Hotline (please specify) (7) Friends (8) Others	
A8.1b	Where did you participate in the basic medical insurance: (1) Domicile (2) Workplace (If not the same city as domicile, and please specify the name of the city) (3)Other (Please specify the name of the city)	
A8.1c	Are you satisfied with the basic medical insurance you currently participated in: (1)Very satisfied (2) Satisfied (3) Neither satisfied nor unsatisfied (If 3 was selected, please skip to A8.2) (4)Unsatisfied (5)Very unsatisfied (If 4 or 5 was selected, pleas skip to A8.1e)	
A8.1d	What makes you satisfied with your medical insurance scheme(Multiple choices): (1)Benefit package (2)Social Propaganda (3) Procedures for handling enrolment (4)Premium (5) Other (then skip to A8.2)	
A8.1e	What makes you unsatisfied with your medical insurance scheme(Multiple choices): (1)Benefit package (2)Social Propaganda (3) Procedures for handling enrolment (4) Premium (5) Other	
A8.2	When did you participate in the medical insurance scheme(s): (YYYY/MM)(Please indicate respectively if with more than 1 insurance schemes)	
A8.3	**If enrolled in any Urban Employees' Basic Medical Insurance scheme**, how much is funded into your personal saving account annually? **(If you don't know, would you**	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
	please let us know your salary range to do some estimation of the account?)(CNY)	
A8.4	Who pay medical insurance: (1) Only individual (2) Only employees (3) Only government (4) Mostly individual (5) Mostly employees (6) Mostly government (7) Others (8) Not clear	
A8.5	**If you bought private health insurance,** how much is the annual premium? (CNY)**(fill in with 999 for who don't know the exact premium)**	
A8.6	Main reasons for not participating in any health insurance schemes: (1)I'm in good health condition and it is unnecessary for me to join in (2) I cannot afford to the insurance premium (3) I cannot afford to the co-payment of medical expenses of the insurance (4) I cannot afford to the part of medical expenses which should be paid by myself in advance before I can get reimbursement (5) Reimbursement procedures are troublesome (6) The reimbursement rate is too low (7)Outpatient expenses are not covered (8)Inpatient expenses are not covered (9Not offered by employers (10) I am not familiar with the schemes (11) Other (12)Don't know how to explain	
B. Disease, Injury and Outpatient Visit over the Past 14 Days		
B1	Do you have chronic disease(s) **formally diagnosed by doctor** in the last six months? (1)Yes (2)No **(Skip to B2)**	
B1.1	If yes, what disease(s)? (If more than 3, please fill in the names of the three most severe)**(According to the disease coding of the National Health Survey)**	
B1.2	In the last three months, how many times have you had outpatient visits for the/these disease(s)?	
B2	Did you feel any discomfort in the last 14 days? (1)Yes (2)No **(Skip to C)**	
B2.1	Which disease(s) or/and injury (injuries) did you suffer from? (Name of the disease(s), fill in with all the names of disease(s))	
B2.2	(Coding of the disease(s). **according to the disease coding of the National Health Survey**)	
B2.3	Which category (categories) did the disease(s) belong to? (1) acute illness or injury (2) acute exacerbation of chronic diseases (3) regular or continuous treatment of chronic diseases	
B3	How long did the disease(s) last? (Within last 14 days, define 1 as a day with 1 or more diseases)	
B4	In the last 14 days, how many day(s) did you drop out from work or school or bedridden because of disease(s)?	
B5	Have you received any treatment for the disease(s) (Self-medication included)? (1)Yes**(Skip to B6)** (2)No	
B5.1	What is your main reason for not taking any treatment? **(After answering, skip to C)** (1) Felt it was not serious (2) Economic difficulties (3) Have no time (4) Inconvenient transportation (5) No effective treatment(s) (6)Other(please specify)	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
B6	What's your treatment? (1) Self-medication and saw a doctor in the last 14 days (2) Saw a doctor in the last 14 days **(skip to B10)** (3) Only self-medication	
B6.1	If (1) chosen for B6, how long would the interval be?	
B7	Why did you choose self-medication? (1)Self-medication under doctor's prescription(s) (2) Felt the disease(s) was/were not serious or not necessary for medical consultation (3)Self-medication was cheaper (4)Have no time (5) Inconvenient transportation (6) Poor doctor service (7) Other	
B8	If self-medicated, where did you get the medicines?**(Limited in 3 choices)** (1) Already had at home (2) Newly purchased from a pharmacy or pharmacies (3) Provided by other people (4) Other**(If 1 or 2 were chosen, skip to B8.1; otherwise skip to B9)**	
B8.1	If the drugs were already had or newly bought, what medicines and how much did it cost in the last 14 days? **(Convert the value into last 2 weeks' dosage for drugs already have and fill in with actual cost for newly bought items)**	
B8.2	If the drugs were newly bought, any suggestions were received by pharmacists	
The following questions were about outpatient visit(s) in the last two weeks, end part B and skip to part C if without and outpatient visit(B5=2 or B6=3)		
B9	How many times have you seen a doctor in the last 14 days?(If 0, skip to Part C)	
The following questions were about the first visit to the doctor(Answered by patient or informants)		
B10	What disease did you visit doctor for? (Respondent(s) with more than 1 diseases in the last 14 days answer this question, otherwise, skip to B11)	
B11	Where did you go for your first outpatient visit? (1) Private clinic (2)Community health service station (3)Community health center (4) Secondary hospitals (5)Tertiary hospital (6)Traditional Chinese Medicine Hospital (7) Military hospital (8) Hospital in other city (9)Private hospital (10) Other	
B11.1	Main reason for choosing that institution: (1) Nearby or convenient transportation (2) Reasonable price (3) Great technical capacity (4) Good facilities and equipment (5)Variety of medicines (6)Great service attitude (7) Medical insurance contracted spot for reimbursement (8) Someone I knew worked there (9) Had a reliable doctor (10) Other	
B12	Total medical expense of the outpatient visit (CNY)	
B12.1	Among which: Out-of-pocket expense(CNY, "**0" for no expense and "999" for not remember)**	
B12.2	Paid by personal saving account (CNY, reimbursement excluded, "**0" for no expense and "999"for not remember**)	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
B12.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember, if "0" was filled in, then ask B12.4, otherwise, skip to B13)**	
B12.4	The reason for not getting reimbursed: (1)Uninsured (2)Not covered by the insurance (3)Didn't know it can be reimbursed (4)Didn't know how to get reimbursement (5)Non-local treatment and have to come back to get reimbursed (6)Low reimbursement rate and didn't care whether reimbursed (7) Other	
B13	How would you evaluate this visit to the doctor: (1)Very satisfied (2)Satisfied (3)Neither satisfied nor unsatisfied (4)Unsatisfied (5)Very unsatisfied **(If your choice is (1) or (2) or (3), skip to B14)**	
B13.1	Main reasons for unsatisfied **(Multiple choices, 3 choices at most)** (1)Low technical capacity (2)Poor facility (3)Limited types of medicines (4)Poor services (5)Unnecessary services (including drugs and examinations) (6)Unreasonable Price (7) High medical expenses (8) Cumbersome procedures (9)Long waiting time (10) Other	
The following questions are about the second visit to a doctor(Answered by patient or insiders)		
B14	What disease did you visit doctor for? (Patients with more than 1 diseases in the last 14 days answer this question, otherwise, skip to B15)	
B15	Where did you go for your second outpatient visit? (1)Private clinic (2)Community health service station (3)Community health center (4)Secondary hospitals (5)Tertiary hospital (6)Traditional Chinese Medicine Hospital (7)Military hospital (8)Hospital in other city (9)Private hospital (10) Other	
B15.1	Main reason for choosing that institution: (1) Nearby or convenient transportation (2) Reasonable price (3) Great technical capacity (4) Good facilities and equipment (5)Variety of medicines (6)Great service attitude (7) Medical insurance contracted spot for reimbursement (8) Someone I knew worked there (9) Had a dependable doctor (10) Other	
B16	Total medical expense of the outpatient visit (CNY)	
B16.1	Among which: Out-of-pocket expense(CNY, "**0" for no expense and "999" for not remember)**	
B16.2	Paid by personal saving account (CNY, reimbursement excluded, **"0" for no expense and "999" for not remember**)	
B16.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember)**	
C. Hospitalization within the Past One Year		
C1	In the past one year, has a doctor advised that you need to be hospitalized? (1)Yes (2)No **(Skip to Part D)**	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		01
C1.1	How many times in the past year?	
C2	In the past year, how many times did you ignore the advice of doctors that you need to be hospitalized? **(Fill in with exact number of times. "0" for "never" and skip to C3)**	
C2.1	Main reason for not being hospitalized: (1)Unnecessary (2) Had no time (3)Financial distress (4) Poor service (5)Price was too high (6) No beds (7)Other	
C3	How many times have you been hospitalized in the past year? **(Fill in with exact number of times. "0" for "never" and skip to Part D)**	
The latest hospitalization in the past one year:		
C4	What kind of illness you were hospitalized for? (1)Disease (2)Injury or poisoning (3)Recovery (4)Birth control (5)Baby delivery (6)Physical examination (7)Other	
C4.1	What was the disease you were hospitalized for? **(Fill in with the disease name, convert into disease coding when verified)**	
C5	Which kind of institution you were hospitalized: (1)Community health service station (2)Community health center (3)Secondary hospital (4)Tertiary hospital (5)Traditional Chinese Medicine Hospital (6) Military hospital (7)Hospital in other city (8)Private hospital (9) Other	
C6	Length of stay in hospital: (days) (DD/MM/YYYY -- DD/MM/YYYY)	
C6.1	Bedridden days before and after hospitalization: **(not include hospitalization, if none, write 0)**	
C7	Reasons for being discharged from hospital: (1)Doctor's advice after fully recovered (2)Doctor's advice before fully recovered (3)My own will (4)Other **(if 3 was chosen, please answer C7.1, otherwise skip to C8)**	
C7.1	Why being discharged from the hospital on your will? (1) Illness hadn't been cured after a long time (2)Financial un-affordability (3)Limited capacity of hospital (4)Poor Services (5)Other	
C8	Total medical expense of the hospitalization(CNY)	
C8.1	Among which: Out-of-pocket expense(CNY, "**0" for no expense and "999" for not remember)**	
C8.2	Paid by personal saving account (CNY, reimbursement excluded, **"0" for no expense and "999" for not remember**)	
C8.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember, if "0" was filled in, then ask C8.4, otherwise, skip to C9)**	
C8.4	The reason for not getting reimbursed: (1)Uninsured (2)Not covered by the insurance (3)Didn't know it can be reimbursed (4)Didn't know how to get reimbursement (5)Non-local treatment and have to come	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
	back to get reimbursed (6)Low reimbursement rate and didn't care if reimbursed (7)Too bothering to go back for reimbursement (8)Other	
C9	During this hospitalization, how much did you spend on transportation, nutrition, food, and/or a personal nurse? (CNY) ("0" for none)	
C10	While you were hospitalized, did you or your family members give gifts or money to hospital employees? (1) Gave money (under the table) (2) Gave gifts (3) Both gifts and money (4) Neither gifts nor money (5) Other (e.g. have dinner with them, etc.)	
C10.1	If yes, how much did you spend?	
C11	How would you evaluate this hospitalization: (1)Very satisfied (2)Satisfied (3)Neither satisfied nor unsatisfied (4)Unsatisfied (5)Very unsatisfied (Skip to C12 for option 1,2 or 3)	
C11.1	Main reasons for unsatisfied (**Multiple choices, 3 choices at most**) (1)Low technical capacity (2)Poor facility (3)Limited types of medicines (4)Poor services (5)Unnecessary services(including drugs and examinations) (6)Unreasonable price (7)High medical expenses (8)Cumbersome procedures (9)Long waiting time (10)Poor environment (11)Inadequate treatment or ineffective treatment (12)Other	
The hospitalization before the latest one in the past year (If you had two or more hospitalizations in the past one year, otherwise skip to Part D)		
C12	What was the disease you were hospitalized for? **(Fill in with the disease name, convert into disease coding when verified)**	
C13	Which kind of institution you were hospitalized: (1)Community health service station (2)Community health center (3)Secondary hospital (4)Tertiary hospital (5)Traditional Chinese Medicine Hospital (6) Military hospital (7) hospital in other city (8)Private hospital (9) Other	
C14	Total medical expense of the hospitalization(CNY)	
C14.1	Among which: Out-of-pocket expense(CNY, "**0" for no expense and "999" for not remember)**	
C14.2	Paid by personal saving account (CNY, reimbursement excluded, **"0" for no expense and "999" for not remember**)	
C14.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember)**	
E. The Health Status and Behavior of Residents Aged 15 and over (Only ask the respondent himself/herself)		
E1	Today, in terms of mobility, you: (1)Can move without any difficulty (2)Have difficulties in moving (3)Bed ridden	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
E2	Today, in terms of taking care of yourself (such as washing and dressing), you: (1)Have no problems at all (2)Have some problems (3) Unable to wash or dress on my own	
E3	Today, in terms of regular daily activities (working, reading or doing housework), you: (1)Without any difficulty (2) Have difficulty (3)Can't do daily routine	
E4	Today, in terms of pain or discomfort: (1)No pain or discomfort (2)Moderate pain or discomfort (3)Extreme pain or discomfort	
E5	Today, in terms of anxiety or depression: (1) No worry or depression (2)Moderate worry or depression (3)Extreme worry or depression	
E6	On this ruler, please indicate the point that best represents your health status today. ◎——◎——◎——◎——◎——◎——◎——◎——◎——◎——◎ 0 10 20 30 40 50 60 70 80 90 100 Worst Best	
E7	Generally speaking, your health status is: (1)Extremely good (2)Good (3)Fine (4)Average (5)Poor	
E8	Compared with one year ago, how would you assess your health status: (1)Much better (2)Better (3)Almost the same (4)A little worse (5)Much worse	
E9	How would you assess your health status compared with that of others in your age? (1)Much better (2)Better (3)Almost the same (4)A little worse (5)Much worse (6)Refuse to answer (7)Don't know	

F. Income and Expenditure of the Household (Answered by the head of household or insider)		
F1	House type: (1)High-rise building (12 stories or higher) (2)High-story building (between high-rise and low-rise) (3)Low-rise building (lower than 7 stories or old buildings lower than 9 stories, without elevator) (4) Tile bungalow (5) Adobe bungalow (6)Others	
F2	The floor space of your house(square meters):	
F1a	Does your family have a car or cars?	
F1b	If does, how much did it cost? Which year did you buy it? (write in the brackets)	
F3	**Last month, the consumption expenditure for living of the family on following items (Operating expense excluded, CNY) :**	
F3.1	Food, such as grain, meat, vegetables, fruits and condiments, etc.	
F3.3	Clothing and daily commodity, e.g. soap, paper, pens, newspapers, etc.	
F3.4	Utilities, such as water, electricity and coal/ fuels, etc.	
F3.5	Rent	
F3.6	Cigarettes and/or alcohol, etc.	
F3.7	Transportation, phone and postage, etc.	
F3.8	Entertainment activities, traveling and education, etc.	
F3.9	Health care and medication	
F3.10	Other expenses like social interactions or gifts, etc.	
F4	**Expenditure on the following items over the past one year (last 12 months):**	
F4.1	Clothing	
F4.2	Education, tuition, books, school supplies etc.(including living expenses for students not living at home)	
F4.3	Insurance premiums (Paid by cash, expense transferred from salaries were excluded, e.g. UEBMI, pension insurance etc.)	

F4.4	Health care and medication (Out-of-pocket only)	
F4.5	Gifts, such as a dowry, wedding gifts, New Year's gifts, funeral expenses, gifts to friends and family, etc.	
F4.6	Durable goods, such as television, radio, electric fan, bicycle, motor van, car, etc.	
F4.7	House purchasing, etc.	
F4.8	Taxes, etc.	
F4.9	Other expenses not included above (Excluding food expenses)	
F5	**The total household income in the past one year (Including the money sent home by family members working out of town as migrants)**	
F6	**How many people in your family share the income and expenditure mentioned above?**	

(End)

Appendix B

Household Survey of Health Services and Pharmaceutical Utilization (2013, XX City)

Coding: City□ District□□ Residents' Committee□□ Household□□

Social Security Number □□□□□□□□□□□□□□□□□□

ID Numbers: □□□□□□□□□□□□□□□□□□

1. Full Name of Head of Household: _____

   Contact Telephone Number:

2. Number of Registered Population in the Household:

3. Address: _____ _____ _____, City

4. Survey Date: _____ (DD/MM/YYYY) Time: _____

Time of filling the form:_____ (DD/MM/YYYY) Signature of Investigator:

Time of Verification:_____ (DD/MM/YYYY) Signature of Verifier:

Investigation Greetings:

Dear Sir/Madam: Hello! We are investigators of Household Survey of Health Services and Pharmaceutical Utilization. The purpose of this survey is to collect information about the health status, medical insurance and health services utilization of residents, and to evaluate the accessibility of medicines, which would provide evidence to improve the health care system in XX city. Your cooperation would be appreciated. According to the Law of Statistics of the People's Republic of China, all of your personal information and your answers to this survey would be kept confidentially and would only be used for our analysis. We hope you would answer the following questions depending on the actual situation. Thank you very much for your cooperation!

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
A. Individual's Basic Information(A1-A8.5 should only be answered by the head of household or insider)		
A1	Full Name of household members: **(Registered members of household only, the head of household was defined as 01)**	
A2	Relationship to the head of household:(1)Head of household (2)Spouse (3)Son/daughter (4)Grandchild (5)Parent (6)Grandparent (7)Brother/sister (8)Daughter-in-law/son-in-law (9)Other	
A3	Gender: (1)Male (2)Female	
A4	Age: **(First birthday after born was defined as 1 year-old, interviewer should use birth date to verify. Please skip to A7 if the interviewee was under 7 years old)**	
A5	Marital status: (1)Unmarried (2)Married (3)Divorced (4) Widowed (5)Remarried (6)Other	
A6	Educational background: (1) Without any schooling (2) Primary school education (3) Junior high school education (4) Senior high school/technical school education (5)Secondary school/secondary technical school education (6) College education (7) University degree or higher qualification	
A7	Profession**(Multiple choices)**: (1)Farmer (2) Labourer (unskilled) (3)Business(self-employed) (4)Medical professional (5)Service industry (6)Teacher (7)School student (8)Enterprise employee (9)Civil servant or government-owned institutions employee (10) Unemployed (11)Other (Please specify) (12) Retiree	
A8.1a	What kind of medical insurance have you joined?**(Multiple choices)**: (1)Urban Employees' Basic Medical Insurance (2)Urban Employees' Basic Medical Insurances for retired employees (3)Urban Employees' Basic Medical Insurance for individuals (4)Urban Residents' Basic Medical Insurance for elderly (5)Urban Residents' Basic Medical Insurance for children (6)Urban Residents' Basic Medical Insurance for college students (7)Urban Residents' Basic Medical Insurance(800CNY category) (8)Urban Residents' Basic Medical Insurance(1200CNY category) (9)Private health insurance (10)Other (please specify) (11)Uninsured **(skip toA8.6)**	
A8.1b	Where did you participate in the basic medical insurance: (1)Domicile (2)Workplace(If not the same city as domicile, and please specify the name of the city) (3)Other (Please specify the name of the city)	
A8.1c	Are you satisfied with the basic medical insurance you currently participated in: (1)Very satisfied (2) Satisfied (3) Neither satisfied nor unsatisfied (If 3 was selected, please skip to A8.2) (4)Unsatisfied (5)Very unsatisfied (If 4 or 5 was selected, pleas skip to A8.1e)	
A8.1d	What makes you satisfied with your medical insurance scheme(Multiple choices): (1)Benefit package (2)Social Propaganda (3) Procedures for handling enrolment (4)Premium (5) Other (then skip to A8.2)	
A8.1e	What makes you unsatisfied with your medical insurance scheme(Multiple choices): (1)Benefit package (2)Social Propaganda (3) Procedures for handling enrolment (4) Premium (5) Other	
A8.2	When did you participate in the medical insurance scheme(s): (YYYY/MM)(Please indicate respectively if with more than 1 insurance schemes)	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
A8.3	**If enrolled in any Urban Employees' Basic Medical Insurance scheme**, how much is funded into your personal saving account annually? **(If you don't know, would you please let us know your salary range to do some estimation of the account?)(CNY)**	
A8.4	**If you bought private health insurance,** how much is the annual premium? (CNY)**(fill in with 999 for who don't know the exact premium)**	
A8.5	Main reasons for not participating in any health insurance schemes: (1)I'm in good health condition and it is unnecessary for me to join in (2) I cannot afford to the insurance premium (3) I cannot afford to the co-payment of medical expenses of the insurance (4) I cannot afford to the part of medical expenses which should be paid by myself in advance before I can get reimbursement (5) Reimbursement procedures are troublesome (6) The reimbursement rate is too low (7)Outpatient expenses are not covered (8)Inpatient expenses are not covered (9Not offered by employers (10) I am not familiar with the schemes (11) Other (12)Don't know how to explain	
B. Disease, Injury and Outpatient Visit over the Past 14 Days		
B1	Do you have chronic disease(s) **formally diagnosed by doctor** in the last six months? (1)Yes (2)No **(Skip to B2)**	
B1.1	If yes, what disease(s)? (If more than 3, please fill in the names of the three most severe)**(According to the disease coding of the National Health Survey)**	
B1.2	In the last three months, how many times have you had outpatient visits for the/these disease(s)?	
B2	Did you feel any discomfort in the last 14 days? (1)Yes (2)No **(Skip to C)**	
B2.1	Which disease(s) or/and injury (injuries) did you suffer from? (Name of the disease(s), fill in with all the names of disease(s))	
B2.2	(Coding of the disease(s). **according to the disease coding of the National Health Survey**)	
B2.3	Which category (categories) did the disease(s) belong to? (1) acute illness or injury (2) acute exacerbation of chronic diseases (3) regular or continuous treatment of chronic diseases	
B3	How long did the disease(s) last? (Within last 14 days, define 1 as a day with 1 or more diseases)	
B4	In the last 14 days, how many day(s) did you drop out from work or school or bedridden because of disease(s)?	
B5	Have you received any treatment for the disease(s) (Self-medication included)? (1)Yes**(Skip to B6)** (2)No	
B5.1	What is your main reason for not taking any treatment? **(After answering, skip to C)** (1) Felt it was not serious (2) Economic difficulties (3) Have no time (4) Inconvenient transportation (5) No effective treatment(s) (6)Other(please specify)	
B6	What's your treatment? (1) Self-medication and saw a doctor in the last 14 days (2) Saw a doctor in the last 14 days **(skip to B10)** (3) Only self-medication	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		01
B6.1	If (1) chosen for B6, how long would the interval be?	
B7	Why did you choose self-medication? (1)Self-medication under doctor's prescription(s) (2) Felt the disease(s) was/were not serious or not necessary for medical consultation (3)Self-medication was cheaper (4)Have no time (5) Inconvenient transportation (6) Poor doctor service (7) Other	
B8	If self-medicated, where did you get the medicines?**(Limited in 3 choices)** (1)Already had at home (2) Newly purchased from a pharmacy or pharmacies (3) Provided by other people (4) Other**(If 1 or 2 were chosen, skip to B8.1; otherwise skip to B9)**	
B8.1	If the drugs were already had or newly bought, what medicines and how much did it cost in the last 14 days? **(Convert the value into last 2 weeks' dosage for drugs already have and fill in with actual cost for newly bought items)**	
B8.2	If the drugs were newly bought, any suggestions were received by pharmacists	
The following questions were about outpatient visit(s) in the last two weeks, end part B and skip to part C if without and outpatient visit(B5=2 or B6=3)		
B9	How many times have you seen a doctor in the last 14 days?(If 0, skip to Part C)	
The following questions were about the first visit to the doctor(Answered by patient or informants)		
B10	What disease did you visit doctor for? (Respondent(s) with more than 1 diseases in the last 14 days answer this question, otherwise, skip to B11)	
B11	Where did you go for your first outpatient visit? (1) Private clinic (2)Community health service station (3)Community health center (4) Secondary hospitals (5)Tertiary hospital (6)Traditional Chinese Medicine Hospital (7) Military hospital (8) Hospital in other city (9)Private hospital (10) Other	
B11.1	Main reason for choosing that institution: (1) Nearby or convenient transportation (2) Reasonable price (3) Great technical capacity (4) Good facilities and equipment (5)Variety of medicines (6)Great service attitude (7) Medical insurance contracted spot for reimbursement (8) Someone I knew worked there (9) Had a reliable doctor (10) Other	
B12	Total medical expense of the outpatient visit (CNY)	
B12.1	Among which: Out-of-pocket expense(CNY, "**0" for no expense and "999" for not remember)**	
B12.2	Paid by personal saving account (CNY, reimbursement excluded, "**0" for no expense and "999" for not remember**)	
B12.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember, if "0" was filled in, then ask B12.4, otherwise, skip to B13)**	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
B12.4	The reason for not getting reimbursed: (1)Uninsured (2)Not covered by the insurance (3)Didn't know it can be reimbursed (4)Didn't know how to get reimbursement (5)Non-local treatment and have to come back to get reimbursed (6)Low reimbursement rate and didn't care whether reimbursed (7) Other	
B13	How would you evaluate this visit to the doctor: (1)Very satisfied (2)Satisfied (3)Neither satisfied nor unsatisfied (4)Unsatisfied (5)Very unsatisfied **(If your choice is (1) or (2) or (3), skip to B14)**	
B13.1	Main reasons for unsatisfied **(Multiple choices, 3 choices at most)** (1)Low technical capacity (2)Poor facility (3)Limited types of medicines (4)Poor services (5)Unnecessary services (including drugs and examinations) (6)Unreasonable Price (7) High medical expenses (8) Cumbersome procedures (9)Long waiting time (10) Other	
The following questions are about the second visit to a doctor(Answered by patient or insiders)		
B14	What disease did you visit doctor for? (Patients with more than 1 diseases in the last 14 days answer this question, otherwise, skip to B15)	
B15	Where did you go for your second outpatient visit? (1)Private clinic (2)Community health service station (3)Community health center (4)Secondary hospitals (5)Tertiary hospital (6)Traditional Chinese Medicine Hospital (7)Military hospital (8)Hospital in other city (9)Private hospital (10) Other	
B15.1	Main reason for choosing that institution: (1) Nearby or convenient transportation (2) Reasonable price (3) Great technical capacity (4) Good facilities and equipment (5)Variety of medicines (6)Great service attitude (7) Medical insurance contracted spot for reimbursement (8) Someone I knew worked there (9) Had a dependable doctor (10) Other	
B16	Total medical expense of the outpatient visit (CNY)	
B16.1	Among which: Out-of-pocket expense(CNY, **"0" for no expense and "999" for not remember)**	
B16.2	Paid by personal saving account (CNY, reimbursement excluded, **"0" for no expense and "999" for not remember**)	
B16.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember)**	
C. Hospitalization within the Past One Year		
C1	In the past one year, has a doctor advised that you need to be hospitalized? (1)Yes (2)No **(Skip to Part D)**	
C1.1	How many times in the past year?	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
C2	In the past year, how many times did you ignore the advice of doctors that you need to be hospitalized? **(Fill in with exact number of times. "0" for "never" and skip to C3)**	
C2.1	Main reason for not being hospitalized: (1)Unnecessary (2) Had no time (3)Financial distress (4) Poor service (5)Price was too high (6) No beds (7)Other	
C3	How many times have you been hospitalized in the past year? **(Fill in with exact number of times. "0" for "never" and skip to Part D)**	
The latest hospitalization in the past one year:		
C4	What kind of illness you were hospitalized for? (1)Disease (2)Injury or poisoning (3)Recovery (4)Birth control (5)Baby delivery (6)Physical examination (7)Other	
C4.1	What was the disease you were hospitalized for? **(Fill in with the disease name, convert into disease coding when verified)**	
C5	Which kind of institution you were hospitalized: (1)Community health service station (2)Community health center (3)Secondary hospital (4)Tertiary hospital (5)Traditional Chinese Medicine Hospital (6) Military hospital (7)Hospital in other city (8)Private hospital (9) Other	
C6	Length of stay in hospital: (days) (DD/MM/YYYY -- DD/MM/YYYY)	
C6.1	Bedridden days before and after hospitalization: **(not include hospitalization, if none, write 0)**	
C7	Reasons for being discharged from hospital: (1)Doctor's advice after fully recovered (2)Doctor's advice before fully recovered (3)My own will (4)Other **(if 3 was chosen, please answer C7.1, otherwise skip to C8)**	
C7.1	Why being discharged from the hospital on your will? (1) Illness hadn't been cured after a long time (2)Financial un-affordability (3)Limited capacity of hospital (4)Poor Services (5)Other	
C8	Total medical expense of the hospitalization(CNY)	
C8.1	Among which: Out-of-pocket expense(CNY, "**0" for no expense and "999" for not remember)**	
C8.2	Paid by personal saving account (CNY, reimbursement excluded, **"0" for no expense and "999" for not remember**)	
C8.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember, if "0" was filled in, then ask C8.4, otherwise, skip to C9)**	
C8.4	The reason for not getting reimbursed: (1)Uninsured (2)Not covered by the insurance (3)Didn't know it can be reimbursed (4)Didn't know how to get reimbursement (5)Non-local treatment and have to come back to get reimbursed (6)Low reimbursement rate and didn't care if reimbursed (7)Too bothering to go back for reimbursement (8)Other	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
C9	During this hospitalization, how much did you spend on transportation, nutrition, food, and/or a personal nurse? (CNY) ("0" for none)	
C10	While you were hospitalized, did you or your family members give gifts or money to hospital employees? (1) Gave money (under the table) (2) Gave gifts (3) Both gifts and money (4) Neither gifts nor money (5) Other (e.g. have dinner with them, etc.)	
C10.1	If yes, how much did you spend?	
C11	How would you evaluate this hospitalization: (1)Very satisfied (2)Satisfied (3)Neither satisfied nor unsatisfied (4)Unsatisfied (5)Very unsatisfied (Skip to C12 for option 1,2 or 3)	
C11.1	Main reasons for unsatisfied (**Multiple choices, 3 choices at most**) (1)Low technical capacity (2)Poor facility (3)Limited types of medicines (4)Poor services (5)Unnecessary services(including drugs and examinations) (6)Unreasonable price (7)High medical expenses (8)Cumbersome procedures (9)Long waiting time (10)Poor environment (11)Inadequate treatment or ineffective treatment (12)Other	
The hospitalization before the latest one in the past year (If you had two or more hospitalizations in the past one year, otherwise skip to Part D)		
C12	What was the disease you were hospitalized for? **(Fill in with the disease name, convert into disease coding when verified)**	
C13	Which kind of institution you were hospitalized: (1)Community health service station (2)Community health center (3)Secondary hospital (4)Tertiary hospital (5)Traditional Chinese Medicine Hospital (6) Military hospital (7) hospital in other city (8)Private hospital (9) Other	
C14	Total medical expense of the hospitalization(CNY)	
C14.1	Among which: Out-of-pocket expense(CNY, "**0" for no expense and "999" for not remember)**	
C14.2	Paid by personal saving account (CNY, reimbursement excluded, **"0" for no expense and "999" for not remember**)	
C14.3	Reimbursement or exempt expense(CNY, **"0" for no expense and "999" for not remember)**	
D. Utilization of Medicines and Resident Satisfactions		
D1	Have you ever taken any medicine in last 14 days: (1)Yes (2)No(**Skip to D4**)	
D	Why did you take medicines?(multiple choice) (1) acute illness or injury (2) acute exacerbation of chronic diseases (3) regular or continuous treatment of chronic diseases	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		01
D2	The category of medicines you have taken is: (1)Traditional Chinese medicine (2)Western medicine (3) Integrated Chinese and Western medicine (中西联合用药) (4)Don't know	
D3	Are you familiar with the recommended dosage of utilization: (1)Yes (2)No	
D4	Are you always take medicine as doctor advised: (1)Yes(**Skip to D5**) (2)No	
D4.1	The main reason for not taking medicines as advised is: (1)Symptom(s) relieved (2)Others recommend not to (3)Poor effectiveness (4)Side effect (5)Other treatment(s) was/were adopted (6)Too expensive (7)Others: (Please specify)	
D5	Usually, you buy prescription drugs at: (1)Community health centers (2)Township hospitals (3)Community Health Stations (4)Village clinics (5)Secondary or tertiary hospitals (6)Private clinics (7)Pharmacies (8)Others: _____(Please specify)	
D5.1	The main reason for choosing that place is: (1) It is nearby or have convenient transportation (2)Have variety of medicines (3)Lower drug prices (4) Medical insurance contracted spot and can get reimbursed (5) Others: _____(Please specify)	
D5.2	How long does it take to reach the place? _____Minute(s)	
D5.2.1	The means of transportation is: (1)On foot (2) Bicycle (3) Bus (4)Metro (5) Taxi/Car (6)Others:	
D5.3	How long does it take to reach the nearest health facility or pharmacy? _____Minute(s)	
D5.3.1	The means of transportation is: (1)On foot (2) Bicycle (3) Bus (4)Metro (5) Taxi/Car (6)Others:	
D6	How well is your medication demand met: (1)All (2)Almost (3)Partially (4)Not met (5)Not sure (**Continue if you choose (4), otherwise skip to D7**)	
D6.1	If not met, the main reason is: (1)Distance or poor transportation (2)Limited types of medicines (3)Always out of stock due to small inventory (4)Prescription restriction on types of medicines (5)Prescription restriction on quantity of drugs (6)Poor effectiveness (7)Side effect (8)Too expensive (9) Others: _____(Please specify)	
D7	Will you ask for specific type(s) of medicines or even a specific medicine when seeing a doctor: (1)Yes (2)No (3)Not sure	
D8	Will you ask for an injection/infusion if you have fever when seeing a doctor: (1)Yes (2)No (3)Not sure	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
D9	Which do you think is more effective, injection/infusion or oral medicine? (1)Injection/infusion (2)Oral medicine (3)Similar (4)Don't know	
D10	Compared with last year, how do you think it is more convenient to get necessary medicines: (1)Absolutely yes (2)Yes (3)Unchanged (4)No (5)Definitely no (6)Don't know	
D11	Compared with last year, what kind of change do you think has occurred to the frequency of injections or infusions when you see a doctor: (1)Greatly increased (2)Increased (3)Unchanged (4)Decreased (5)Greatly decreased (6)Don't know	
D12	Compared with last year, what kind of change do you think has occurred to the types of drugs you use in the community health centers or township hospitals: (1)Greatly increased (2)Increased (3)Unchanged (4)Decreased (5)Greatly decreased (6) Don't know	
D13	What do you think of the qualities of the medicines took in the community health centers or township hospitals: (1)Very satisfied (2)Satisfied (3)General (4)Unsatisfied (5)Very unsatisfied (6)Don't know	
D14	What do you think of the effectiveness of the medicines took in the community health centers or township hospitals: (1)Very satisfied (2)Satisfied (3)General (4)Unsatisfied (5)Very unsatisfied (6)Don't know	
D15	Compared with the past, what do you think of medicine prices: (1)Greatly increased (2)Increased (3)Unchanged (4)Decreased (5)Greatly decreased (6)Cannot tell	
16	Compared with the past, what do you think of your medical expense burden: (1)Greatly increased (2)Increased (3)Unchanged (4)Decreased (5)Greatly decreased (6)Don't know	
E. The Health Status and Behavior of Residents Aged 15 and over (Only ask the respondent himself/herself)		
E1	Today, in terms of mobility, you: (1)Can move without any difficulty (2)Have difficulties in moving (3)Bed ridden	
E2	Today, in terms of taking care of yourself (such as washing and dressing), you: (1)Have no problems at all (2)Have some problems (3) Unable to wash or dress on my own	
E3	Today, in terms of regular daily activities (working, reading or doing housework), you: (1)Without any difficulty (2) Have difficulty (3)Can't do daily routine	
E4	Today, in terms of pain or discomfort: (1)No pain or discomfort (2)Moderate pain or discomfort (3)Extreme pain or discomfort	
E5	Today, in terms of anxiety or depression: (1) No worry or depression (2)Moderate worry or depression (3)Extreme worry or depression	
E6	On this ruler, please indicate the point that best represents your health status today. ◎——◎——◎——◎——◎——◎——◎——◎——◎——◎——◎ 0 10 20 30 40 50 60 70 80 90 100	

Coding of Respondents (The head of household was defined as 01, and others were coded based on the survey order)		**01**
	Worst Best	
E7	Generally speaking, your health status is: (1)Extremely good (2)Good (3)Fine (4)Average (5)Poor	
E8	Compared with one year ago, how would you assess your health status: (1)Much better (2)Better (3)Almost the same (4)A little worse (5)Much worse	
E9	How would you assess your health status compared with that of others in your age? (1)Much better (2)Better (3)Almost the same (4)A little worse (5)Much worse (6)Refuse to answer (7)Don't know	

F. Income and Expenditure of the Household (Answered by the head of household or insider)		
F1	House type: (1)High-rise building (12 stories or higher) (2)High-story building (between high-rise and low-rise) (3)Low-rise building (lower than 7 stories or old buildings lower than 9 stories, without elevator) (4) Tile bungalow (5) Adobe bungalow (6)Others	
F2	The floor space of your house(square meters):	
F1a	Does your family have a car or cars?	
F1b	If does, how much did it cost? Which year did you buy it? (write in the brackets)	
F3	**Last month, the consumption expenditure for living of the family on following items (Operating expense excluded, CNY) :**	
F3.1	Food, such as grain, meat, vegetables, fruits and condiments, etc.	
F3.3	Clothing and daily commodity, e.g. soap, paper, pens, newspapers, etc.	
F3.4	Utilities, such as water, electricity and coal/ fuels, etc.	
F3.5	Rent	
F3.6	Cigarettes and/or alcohol, etc.	
F3.7	Transportation, phone and postage, etc.	
F3.8	Entertainment activities, traveling and education, etc.	
F3.9	Health care and medication	
F3.10	Other expenses like social interactions or gifts, etc.	
F4	**Expenditure on the following items over the past one year (last 12 months):**	
F4.1	Clothing	
F4.2	Education, tuition, books, school supplies etc.(including living expenses for students not living at home)	
F4.3	Insurance premiums (Paid by cash, expense transferred from salaries were excluded, e.g. UEBMI, pension insurance etc.)	

F4.4	Health care and medication (Out-of-pocket only)	
F4.5	Gifts, such as a dowry, wedding gifts, New Year's gifts, funeral expenses, gifts to friends and family, etc.	
F4.6	Durable goods, such as television, radio, electric fan, bicycle, motor van, car, etc.	
F4.7	House purchasing, etc.	
F4.8	Taxes, etc.	
F4.9	Other expenses not included above (Excluding food expenses)	
F5	**The total household income in the past one year (Including the money sent home by family members working out of town as migrants)**	
F6	**How many people in your family share the income and expenditure mentioned above?**	

(End)

Appendix C

Focus Group Discussion Guidelines – Patients with NCD

Part 1 General Information

1. When are you first diagnosed with XX (non-communicable diseases)?
2. What kind of medicines you use now?
3. Where do you usually refer to when feeling not well? Why?
4. Where do you usually go to purchasing drugs? Why?
5. What kind of insurance are you enrolled in?

Part 2 Evaluation of NCD Medication

1. What medicine you feel is most efficient? Do you current use this medicine? If not, why and what you use as a substitute?
2. How you choose medicines for XX (non-communicable diseases)? Do you believe doctors?
3. What do you think the relationship between drug quality and price? What you prefer, domestic or imported drugs? How much you can afford for XX drugs?
4. Where do you purchase these medicines?
   - 4.1. If from community health centers, please explain the reason?
     Can you get the whole set of medicines from CHC?
     If not, what you will do? Why?
   - 4.2. If not from community health center, please explain the reason and why not community health center?
     Are the medicines you purchase included in Medical Insurance Catalogue?
5. How long do you visit a doctor for prescription? Why?
6. Have you changed medications? Why and when?

Part 3 Opinions and attitude toward use of health services and medicines

1. Where you usually refer to when feeling ill?

2. If not CHC has you ever visited CHC? What you impression? What is good and bad about CHC? What the difference between hospitals and CHC?
3. What you satisfied and unsatisfied about the use of health services and medicines? Have you felt any changes in recent years?

Appendix D

Focus Group Discussion Guidelines – Healthcare Providers

Part 1 General Information

1. How many patients are accepted each day?
2. How many patients you usually see one day? And how many NCD patients?
3. What recent health policy changes?

Part 2 Essential Medicine Scheme

1. When it is actually implemented?
2. How it influenced the stocked medicines? The price and quality?
3. What are the effects to NCD patients?
   3.1. What is the patients' reflection?
   3.2. How healthcare providers deal with it?
4. What are the effects to you and health facilities?
   4.1. How it affected the volume patients
   4.2. How it affected the revenue and income?

Part 3 Medical Insurance Regulations

1. What the recent regulation changes?
2. How it affected health providers
3. How it affected NCD patients?

Part 4 Opinions and attitudes

1. How you evaluated you work?
2. What do you think the function of community health center and higher-level hospitals?
3. Do you have suggestions for policy reform?

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